THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
September 28, 1987 · Vol. XXI · No. 39 · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

Spotlight — Seventh annual Hardware Roundup of small systems. Pullout section.

In Depth — Eager for technology, China finds U.S. bureaucracy inscrutable. **Page 67.**

Toshiba announces built-in-the-U.S.A. portable with Intel 80386 chip. Page 2.

More than 1,300 Macintosh II users can be networked with products debuting this week from Apple and Northern Telecom. Page 6.

Security flaws in DB2 are expected to be addressed by IBM, but not in the near future. Page 12.

AT&T rolls out network control products and a unified management architecture. Page 8.

Mitch Kapor out of 'retirement' in venture with leading lights from Lotus and Ashton-Tate. Page 4.

More powerful solid-state disk drive announced by Storage Technology. Page 10.

ADR preps a distributed data base management system. Page 5.

Initial step taken in Wang's multivendor connectivity plan. Page 49.

IBM's unprecedented sales venture with Hogan fails to deliver the anticipated goods. Page 95.

Windows open to 80386 power

Microsoft delivers multiple MS-DOS sessions; effect on OS/2 questioned

BY DOUGLAS BARNEY
and STEPHEN JONES
CW STAFF

REDWOOD CITY, Calif. — Microsoft Corp. last week unveiled Windows/386, an operating environment that taps the multitasking capability of Intel Corp. 80386-based computers. Until now, these machines have functioned largely as souped-up single-task IBM Personal Computer ATs.

Despite the technical achievement, some users criticized the product. Others, however, gave it a thumbs-up.

Some said that by offering capabilities beyond those of Microsoft's MS-DOS, the $195 Windows/386 may compete with its maker's upcoming OS/2 operating system, posing a confusing choice to advanced users seeking more PC power. Others argued that the long-awaited Windows/386 provides much-needed multitasking capabilities and will serve as a highly useful tool.

"It would complicate our environment, but this package would be kind of nice. We are not, however, looking to support another environment," said David L. Lee, information center manager at M. W. Kellogg Co., a Houston-based designer and builder of petrochemical plants. Most of Lee's 386-based machines are dedicated to a single task, which makes a product such as Windows/386 less useful.

Another corporate manager lamented the "diversion" of Microsoft resources. "It is taking away resources from OS/2 development and taking away resources from applications for that environment," said Jeff Ehrlich, manager of product technology at General Electric Co.'s Corporate Information Technology. "Users are getting thoroughly confused about systems software directions at this point."

But for Michael S. Heschel, corporate vice-president of information resources at Baxter

Continued on page 6

Long wait ends as HP ships top-line Spectrum

BY JULIE PITTA
CW STAFF

LAS VEGAS — Paying off users who had gambled on its reduced instruction set computing development project, Hewlett-Packard Co. last week announced it has begun deliveries of the delayed high-end HP 3000 Series 950 general-purpose system.

Attendees at the Interex HP users group meeting here expressed relief that the company had resolved the problems plaguing its Spectrum development project. "It's been a long time in coming, but it's worth it," said Denys A. Frame, technical support manager for a branch of Northern Telecom, Inc.

"Finally," said P. H. Wergeland, financial systems supervisor for Boeing Commercial Airplane Co. "I've been hearing about this for two years."

The mood at the users group meeting sharply contrasted with the climate at last year's gathering in Detroit, where HP told users that shipments of both the 7 million instructions per second Series 950 and the 4.5 MIPS Series 930 would be delayed as a result of problems with the operating system's I/O. In the case of the top-of-the-line Series 950, HP projected that delivery could be as much as a year late.

Continued on page 130

MAP users group lays down law

BY KATHY CHIN LEONG
CW STAFF

DALLAS — In a dramatic move to provide stability in the factory automation arena, vendors offering products based on the Manufacturing Automation Protocol will be required to comply for six years with the version slated for completion in June 1988.

The MAP/TOP Users Group steering committee here last week declared that MAP Version 3.0 will undergo no major revisions during the six-year period.

The news provides comfort to potential MAP users who have been uncertain about where the specification is headed. Vendors, likewise, said they expect the announcement to cause future sales to escalate.

According to the so-called "stability document," the users

Continued on page 8

URBAN FLIGHT

Moving on out to the 'burbs

BY STANLEY GIBSON
and ALAN ALPER
CW STAFF

Frustrated by the flight of businesses from New York City, Mayor Edward I. Koch recently had himself photographed boarding up the Holland Tunnel leading to New Jersey. If the picture is accurate, Koch is not much of a carpenter.

But he does know how to drive home a point.

Koch's photograph was part of an advertising campaign designed to keep businesses, particularly data centers, from leaving his city for greener pastures in New Jersey.

New York finds itself at the top of the list of municipalities currently experiencing a DP exodus. The trend is shared to varying degrees by such cities as Washington, D.C., San Francisco, Chicago and Boston.

Cramped quarters

Data centers in many cities face ballooning rents and cramped quarters. In some localities, zoning rules and tax rates are obstacles.

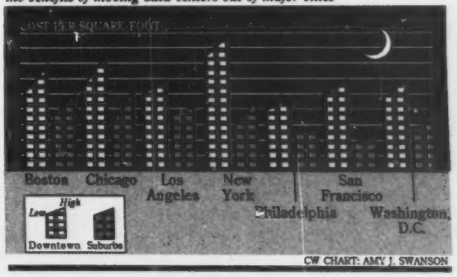
Although removing data processing operations from a crowded city and planting them in a more spacious plot is not a novel idea, the move to do so is gaining momentum.

"Everyone is moving

Continued on page 129

Call of the suburbs

Range of typical rental rates provided by local observers demonstrates the benefits of moving data centers out of major cities



CW CHART: AMY J. SWANSON

NEWSPAPER
CW 06970416 24122300 300
5-DIGIT 48106
XXXXXXXXXXXXXXXXXXXX
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106
SECOND CLASS

IN THIS ISSUE

Is it ready yet? ADR's distributed DBMS is met with skepticism as it is readied for beta testing, but ADR says the product is 'mature.' Page 5.

Drive option. MIS managers laud Rodime's 45.5M-byte hard disk drive for the PS/2 Model 50, a replacement the 20M-byte drive that comes in the system, but say they will test and evaluate the need for it before committing. Page 6.

NEWS

4 Tecmar memory-expansion card for PS/2 enhanced with EMS.

4 Ex-Lotus, Ashton-Taters form PC software firm.

4 IBM-Fujitsu arbitrators indirectly influence trends in mainframe industry.

6 Apple, Northern Telecom to roll out Lanstar Appletalk at TCA '87.

8 AT&T describes Unified Network Architecture scheme.

8 Justice Department says Southwestern Bell violated AT&T decree.

10 Storage Technology adds to solid-state capacity.

10 Infomart's CIM Ideacenter prepares to open after two-month delay.

12 IBM will enhance DB2, but not for 1½ to two years.

13 Users, analysts cite DB2's security weaknesses.

14 Cullinane officially leaves Cullinet.

15 Borland unveils Quattro spreadsheet.

16 Pyramid moves into on-line transaction processing market.

17 Ridge rolls out its most powerful supermini to date.

17 Data Design opens its financial software to PC processing.

128 Network Systems designs interface between TCP/IP, Ethernet networks.

128 Vendors flock to TCA '87 looking for telecom networking solutions.

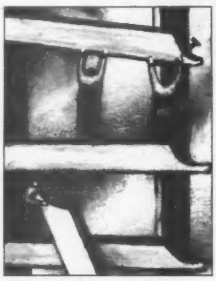
130 Software AG develops networking utility for DEC hardware.

SOFTWARE & SERVICES

23 Schwab DB2 benchmark draws fire.

23 McClure cites need to integrate CASE tools.

23 Candle designs conferencing tool for VTAM users.



China builds an information industry. Page 67.

MICROCOMPUTING

37 Mac compatibility issues arise with announcement of operating system.

37 Lotus exec provides glimpse into future.

NETWORKING

49 Wang plunges into Ethernet with VS host links.

49 3Com awaits Bridge merger in light of Novell's growth.

49 Banyan introduces 80386 engine to fire up file server.

SYSTEMS & PERIPHERALS

57 Unisys adds 1100/90 models with higher memory, lower prices.

57 DEC forms partnerships in CIM markets.

57 NAS challenges IBM in engineering/scientific marketplace.

Quotable

"People ask me if I'll miss having the reins, and I've been telling them that it's more like I've been pulling the wagon."

JOHN J. CULLINANE
CULLINET SOFTWARE, INC.

See story page 14.

MANAGEMENT

79 Black DPers warned about global competition.

79 Profile: Hacker turned systems developer for Pacific Telesis.

79 MIS focuses on Chinese workers.

COMPUTER INDUSTRY

95 IBM's OEM agreement not bearing fruit for Hogan.

95 On-Line acquires consulting firm.

95 Apollo investigated for unauthorized activity in foreign exchange market.

95 Nestar's Morrow can't stop producing.

COMPUTER CAREERS

109 Today's career paths require structured approach.

SPOTLIGHT

Roundup, Round 2: Small systems power up.

Pullout section.

IN DEPTH

67 China's push for technological parity with the West. Part one of a series. By John Maier.

OPINION & ANALYSIS

21 Barnes rides the shirttails to productivity.

23 Babcock recaps Schwab benchmark controversy.

37 Barney wants new software applications.

49 Keefe prepares for 3Com, Bridge wedding.

57 Bozman advocates freedom of choice and benchmarks.

79 Mallach runs down educational resources.

95 Martin boycotts acronyms.

DEPARTMENTS

20 Editorial

90 Calendar

123 Buy Sell Swap

130 Inside Lines

Toshiba 386 laptop sited

California assembly, January delivery planned

IRVINE, Calif. — Toshiba Information Systems upped the ante in the growing market for high-performance laptop computers with the announcement last week of the T5100, the firm's first laptop based on Intel Corp.'s 80386 processor.

Toshiba, maker of the popular T3100 IBM Personal Computer AT-compatible laptop, will assemble the T5100 in Irvine, Calif.; the $6,499 machine, however, is not scheduled to be available until January 1988.

Domestic manufacturing allows the firm to skirt U.S. tariff restrictions imposed on Japanese-produced computer systems. These tariffs once threatened Toshiba's ability to compete in the U.S. laptop market and caused some dealers to stockpile Toshiba machines in an attempt to satisfy demand.

The T5100, which recently made its debut in Europe, comes equipped with an 80386 microprocessor running at 8 or 16 MHz, an 80387 coprocessor socket, 2M bytes of random-access memory (RAM) and a 40M-byte hard disk drive that offers a 29-msec average access time. The machine comes standard with Microsoft Corp.'s MS-DOS 3.2 operating system.

Users can expand the machine to up to 4M bytes of RAM to take advantage of expanded memory protocols. The combination of the 80386 chip and additional memory should allow the T5100 to run Microsoft's OS/2 operating system, scheduled to become available next year.

To ensure a measure of compatibility with IBM's Personal System/2 family of micros, the 15-lb T5100 uses a similar 1.44M-byte floppy disk drive.

In an effort to position the laptop as a usable desktop machine, Toshiba will offer an interface for a parallel printer and an RS-232C serial port. In addition, a five-card expansion chassis, compatible with the IBM PC, will be available for $1,000.

The machine, equipped with a gas-plasma display, also includes a built-in IBM Enhanced Graphics Adapter (EGA) capability and an EGA monitor port.

Options include a $400 1,200 bit/sec. modem that is Hayes Microcomputer Products, Inc. compatible, a $500 external 5¼-in. 360K-byte floppy disk drive and a $200 link system.

Computer monitoring seen as potential labor problem

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — An estimated six million Americans have their work monitored by computer systems, a situation that could flare up as a major labor relations issue unless handled properly by management, according to a congressional study released last week.

"The Electronic Supervisor," a report from the U.S. Congress' Office of Technology Assessment (OTA), noted that many workers and their labor unions claim computer monitoring is an invasion of privacy and increases job stress.

Computer monitoring can take the form of electronic surveillance of the keystrokes made by data entry personnel, monitoring the records of digital telephone systems and spot inspections of personal computer diskettes.

The OTA's report concluded that the issue boils down to a balancing act between employers' rights to improve their facilities' efficiency, productivity and security and workers' rights to maintain privacy and dignity. The report hinted that unless managers defuse the problems, the federal government will come under increasing pressure to take action.

"Electronic monitoring is most likely to raise opposition among workers when it is imposed without worker participation, when standards are perceived as unfair or when performance records are used punitively," the OTA reported.

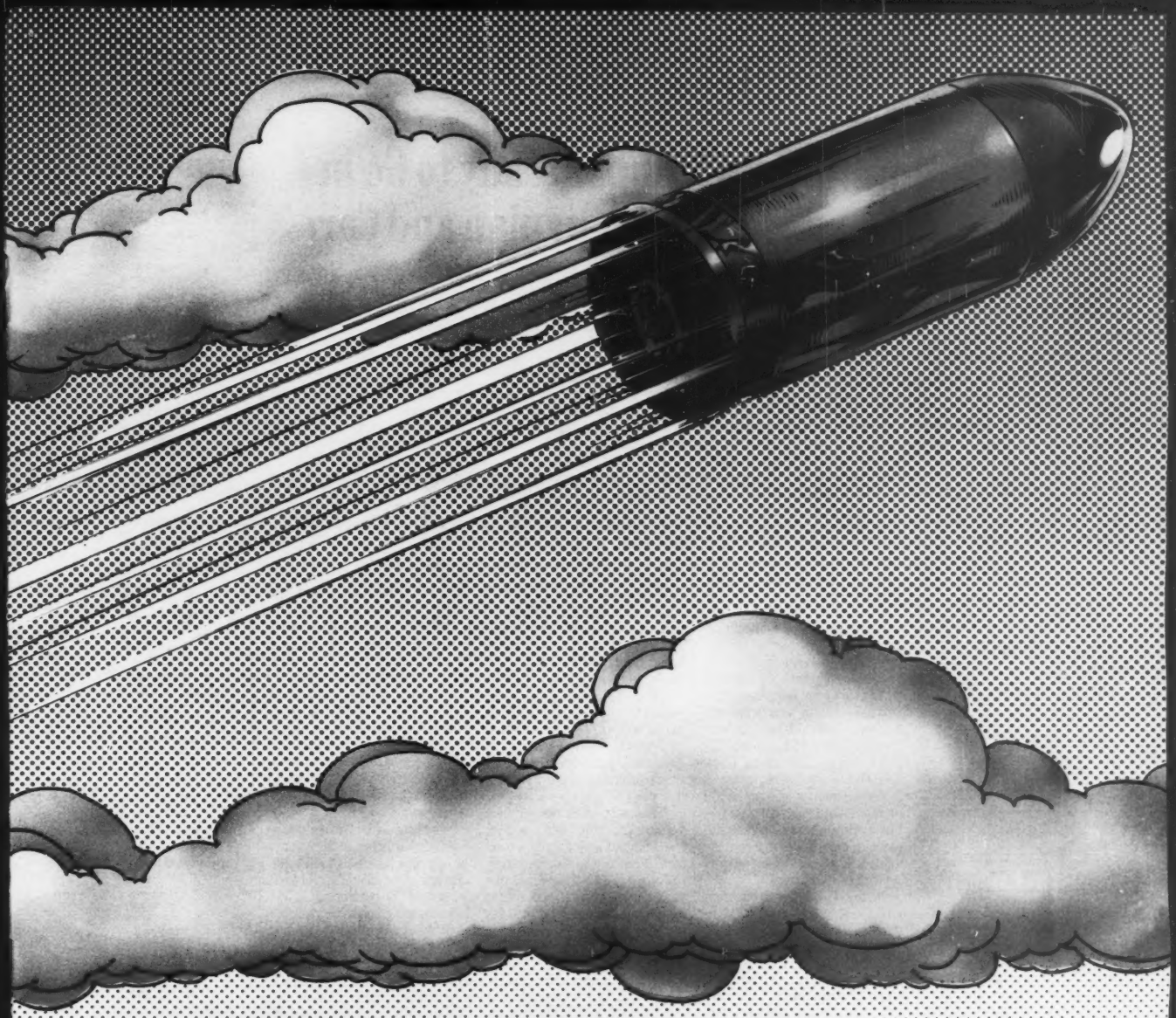
A growing threat

Rep. Jack Brooks (D-Texas) and Rep. Don Edwards (D-Calif.) requested the study. Edwards said Congress and the state legislatures should respond to the "growing threat" of computer monitoring.

"With computers, employers can monitor the most minute details of their employees' lives on the job," including how long employees are at their workstations and how many keystrokes they make, he said.

A statement by the Computer and Business Equipment Manufacturers Association (CBEMA), which stressed the positive aspects of computer monitoring, called the OTA report a balanced assessment of the issue.

In its statement, CBEMA called for the "sensible use" of computer work measurement to avoid negative reactions by employees.



SYNCSORT CMS CAN'T LEAP TALL BUILDINGS. BUT IT IS FASTER THAN A SPEEDING YOU-KNOW-WHAT.

There's nothing mild-mannered about us. We come right out and prove how fast our sorts are.

And, in the case of SyncSort CMS, our sorting product for the VM environment, that speed results in dramatic reductions in the use of your computer resources (CPU Time, SIOs, disk work space and the like).

But SyncSort CMS is a lot more than a sort; it also has features that can make any programmer super-productive.

Plus, our service staff is almost as fast as our sorts (85% of all service requests are resolved within 24 hours).

Of course, the only way to really believe the powers of SyncSort CMS is to see it with your own eyes: to arrange for a test on your system call us at **201-930-9700.**

Once you've tried SyncSort CMS, you'd have to be a man of steel to resist it.

syncsort

THE BEST OF SORTS.℠

© 1987 Syncsort Incorporated, 50 Tice Boulevard, Woodcliff Lake, NJ 07675.

And the winner is ...

IBM, Fujitsu may both win once dust settles

BY CLINTON WILDER
CW STAFF

ANALYSIS

In promulgating and now defining the terms of the landmark IBM-Fujitsu Ltd. arbitration case announced 13 days ago, arbitrators Robert H. Mnookin and John L. Jones could indirectly be responsible for shaping new trends in the mainframe industry worldwide.

The opinions of legal and industry experts vary widely as to whether it was IBM or its leading Japanese competitor that came out ahead in the decision that gave Fujitsu, for substantial fees yet to be determined, unprecedented vendor access to IBM source code.

IBM and then the rest
Worldwide 1986 market shares for large-scale systems, based on 4,275 shipments

IBM	49%
Siemens AG	8%
Fujitsu	7%
Unisys Corp.	6%
Hitachi Ltd.	6%
Honeywell Bull, Inc.	6%
Amdahl Corp.	5%
NAS	4%
NEC Corp.	3%
Control Data Corp.	2%
Comparex	1%
Other	3%

INFORMATION PROVIDED BY INTERNATIONAL DATA GROUP
CW CHART

Choosing a winner and loser may not be possible until those fees are announced by the arbitrators within the next few months.

However, in the long term, the real winner may not emerge until both companies — and the scores of other firms potentially affected by the decision — sail into their new courses in the marketplace as a result of the settlement terms.

"In this decision, I have a feeling we're not seeing much more than the tip of the iceberg of more global strategies for both companies," says Daniel T. Brooks, a partner in charge of the computer law practice at Cadwalader, Wickersham & Taft in Washington, D.C.

Certainly, IBM is giving up something it would have preferred not to — protection of the proprietary secrets at the heart of its mainframe software.

In a report released last week, Prudential-Bache Securities, Inc. analysts wrote that despite Fujitsu's royalty payments — which observers expect to be in the hundreds of millions — IBM would rather keep control of the software. Nonetheless, there may be benefits for IBM that are not yet apparent.

Impact from overseas

From the U.S. industry perspective, it is often disregarded that IBM, like most major vendors, derives a large chunk of its revenue from overseas sales. If the settlement terms help IBM Japan gain market share in Japan, the impact on Big Blue in the U.S. could be substantial.

IBM can now license the Fujitsu operating system for its own mainframes, which means nothing in the U.S. but could be critical in the Japanese marketplace.

The ability to offer Fujitsu software gives IBM Japan a potentially competitive weapon to penetrate current Fujitsu accounts with what would essentially be Fujitsu plug-compatible systems. These would perhaps be sold with a Japanese label through IBM OEM partners Toshiba Corp., Mitsubishi Corp. and Oki Electric Industries Co.

IBM Japan is already a remarkable U.S. success story in the world's second largest single-nation computer market, and its new cross-licensing freedom could prove lucrative.

In the U.S., the arbitration settlement may give IBM a strong shield against a threat it has historically feared more than any other — the U.S. government and its antitrust division. When IBM agreed in 1983 that major disputes arising with Fujitsu could be settled through binding arbitration, it did so with its 10-year legal battle with the Department of Justice hovering just one year behind it.

Some say IBM could have won its trade-secret theft case against Fujitsu in court, denied the Japanese firm any use of its systems software and effectively removed a competitor from the plug-compatible marketplace.

But would that result have been monumental enough to awaken the sleeping antitrust enforcement giant? Fujitsu certainly would have sounded the alarms loudly, and one suspects IBM competitors from all corners of the industry would have joined in.

However, with its mainframe software doors forced open by arbitrators, IBM can now argue that healthy mainframe competition will exist; the arbitrators said so themselves in their decision.

At least for as long as the Fujitsu access lasts, IBM gains an edge against the shifting political winds regarding antitrust — and gets a few hundred million dollars to boot.

Kapor ready to Go in with Kaplan and Carr

BY DOUGLAS BARNEY
CW STAFF

SAN FRANCISCO — The founder of Lotus Development Corp., the former chief scientist at Ashton-Tate and Lotus's artificial intelligence guru have formed a microcomputer software company that plans to develop what the men said will be a "new class of personal productivity applications."

Mitchell D. Kapor

But do not line up just yet to buy products from the new company, called Go Corp. According to its founders, the firm will be in a research and development mode for two to three years before applications debut.

These horizontal applications will be targeted at professionals and managers. The products will be based on a new concept in software, which none of the firm's principals were willing to describe.

This start-up marks the first venture for Mitchell D. Kapor, the founder and former chairman of Lotus who resigned from the board of directors earlier this year, since leaving the company. According to Kapor, Go was announced to defray rumors that were sure to arise about the company. Kapor, along with San Francisco-based Kleiner Perkins Caulfield & Byers, has invested in the firm. Kapor will also be an active member of the firm's board of directors and assist with product design and strategy.

Working with Kapor are S. Jerrold Kaplan, former principal technologist at Lotus and president of Go, and Robert M. Carr, former chief scientist at Ashton-Tate and vice-president of software for Go.

Kaplan, who has been working with Kapor on a still-unannounced product for Lotus, is a noted expert in the field of artificial intelligence. Carr, who wrote Ashton-Tate's Framework, is known for his strength in user interfaces. That combination of expertise is expected to produce products combining easy access with the ability to intuitively modify applications.

Although the applications will include some flavor of AI, they will not be so-called AI products.

"We plan to use the real thing," he said. Kapor admitted, however, that AI will play a role in the products. "They will be infected with the AI virus."

The firm said it has not decided what hardware architectures or operating systems to develop around. "We have to project what kinds of environments and systems are going to be available at that time. There are a number of routes we could take: go for portability across a series of different environments or target one that we think would be important. We just haven't decided," Kaplan said. "We'll see you in a few years."

Add-in boasts EMS support

BY JAMES A. MARTIN
CW STAFF

CLEVELAND — Tecmar, Inc. said last week it plans to be the first IBM Personal System/2 add-in board vendor to support the new Lotus/Intel/Microsoft Expanded Memory Specification (EMS) Version 4.0.

Tecmar's Microram, a previously announced memory expansion card for the PS/2 Models 50, 60 and 80, will be enhanced with a software driver compatible with EMS 4.0, the firm said. Shipment is set to begin Oct. 15.

EMS 4.0 will reportedly give PS/2 users a preliminary taste for the multitasking and expanded memory capabilities of IBM and Microsoft Corp.'s OS/2.

"The user can have memory above the current 640K-byte random-access memory limitations for running programs and storing data as well as for some multitasking environments," including Microsoft's Windows 2.0, said Dan Lucarini, director of marketing for Tecmar.

Tecmar is offering EMS 4.0 software driver upgrades to other existing memory and multifunction boards as well. The cost of Tecmar's boards is not expected to change as a result of the EMS upgrades.

Tecmar has also changed the Microram/2 name to Microram as a concession to IBM, which has recently pressured board makers to refrain from adding the "/2" suffix to product names and marketing materials.

Meanwhile, other enhancement board vendors are also working to support the new EMS version. For example, at Comdex/Fall '87, Quadram in Norcross, Ga., will reportedly announce plans to add EMS 4.0 to its boards currently supporting EMS.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

News Editor
Peter Bartolik

Senior Editors
James Connolly, Systems
Clinton Wilder, Industry
Elisabeth Horwitt, Networking
Charles Babcock, Software
David Ludlum, Management
Douglas Barney, Microcomputing
Patricia Keefe, Networking
Ed Scannell, Microcomputing

Senior Writers
Rosemary Hamilton
Stanley Gibson

Staff Writer
Alan J. Ryan

New Products Editor
Suzanne Weixel

Features Editor
George Harrar

Senior Editors
Janet Fiderio
Glenn Rifkin
Joanne Kelleher
Amy Sommerfeld Fiore

Associate Editor
Deborah Fickling

Assistant Editor
Kelly Shea

Senior Writer
Michael L. Sullivan-Trainor

Researcher
Sally Cusack

Assistant Researcher
Bonnie MacKeil

Intern
Jeff Goodwin

Managing Editor
Donovan White

Chief Copy Editor
Patricia Heal Erickson

Assistant Chief Copy Editor
Steven M. Ulfelder

Copy Editors
David W. Bromley
Mary Grover
Martha E. Ruch
Sharon Baker
Laura O'Connell
Marie T. Burke
James Daly

Design Editor
Marjorie Magowan

Graphics Editor
Mitchell J. Hayes
Graphics Assistant
Amy J. Swanson

Graphic Designer
P. Charles Ladouceur

Assistant to the Editor in Chief
Theresa Gallant
Editorial Assistants
Patricia Faherty
Christie Sears
Linda Gorgone

Rights and Permissions Manager
Nancy Shannon

News Bureaus
Mid-Atlantic
201/967-1350
Alan Alper, Correspondent

Washington, D.C.
202/347-6718
Mitch Betts, Correspondent

West Coast
415/347-0555
Kathy Chin Leong, Manager
Julie Fitta, Senior Correspondent
James A. Martin, Correspondent
Stephen Jones, Correspondent
Mary Elliston, Editorial Assistant

Midwest
312/827-4433
Jean S. Bozman, Correspondent

IDG News Service
Kathleen A. Gow, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

ADR tests distributed DBMS waters

BY ROSEMARY HAMILTON
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. is readying a distributed data base management system for beta test this fall and is planning to release the product in the first quarter of 1988, company officials confirmed last week.

The debut of Inforeach comes at a time when most industry observers are saying that true distributed DBMSs are at least two years away because they pose such a difficult technological challenge.

"I'm very skeptical," said Michael Braude, a vice-president at the Gartner Group, Inc. in Stamford, Conn. "They haven't gotten it out yet, so it's still vaporware. I seriously doubt they'll be able to deliver it when they say they will. They might, but it's a lot easier to talk about."

ADR officials, however, said Inforeach will be a mature product with the key requirements for a distributed DBMS, such as a global data dictionary with subsets of that dictionary at local sites, as well as features like partioning, replication and a multinode update.

ADR said the product is at one beta-test site and will be shipped to two others within six weeks. "This is not an initial step," said Joseph Farrelly, ADR's vice-president of research and development. "No doubt there is more to do, but this is a mature distributed DBMS."

Datacom/DB partner

Inforeach is designed to work as a companion product to the company's DBMS, Datacom/DB. It provides the distributed capability to that environment and will rely on ADR's Datadictionary. Company officials said they plan to add support of IBM SQL in late 1988.

Initially, the product will be offered for the IBM MVS and VSE environments. An MVS license costs $55,000, and a VSE license will be priced at $43,000.

Farrelly pointed out that additional features will be added to Inforeach over time. The current Inforeach, for instance, has limited query-optimization features. The product cannot select the most efficient method of query once it moves beyond a local data base.

Thus if a user in San Francisco were to request data that resided in both New York and Chicago, the system would not know that it would be quicker to retrieve the data from Chicago.

Inforeach bases its roots in ADR's D-Net, a product introduced in 1983 that has approximately 100 users. D-Net provides limited distributed functions. Users can access remote data bases and view data, for instance, but they cannot update remote data.

ADR said Inforeach is actually a new release of D-Net. Because it underwent a significant amount of reworking, however, D-Net's name was changed.

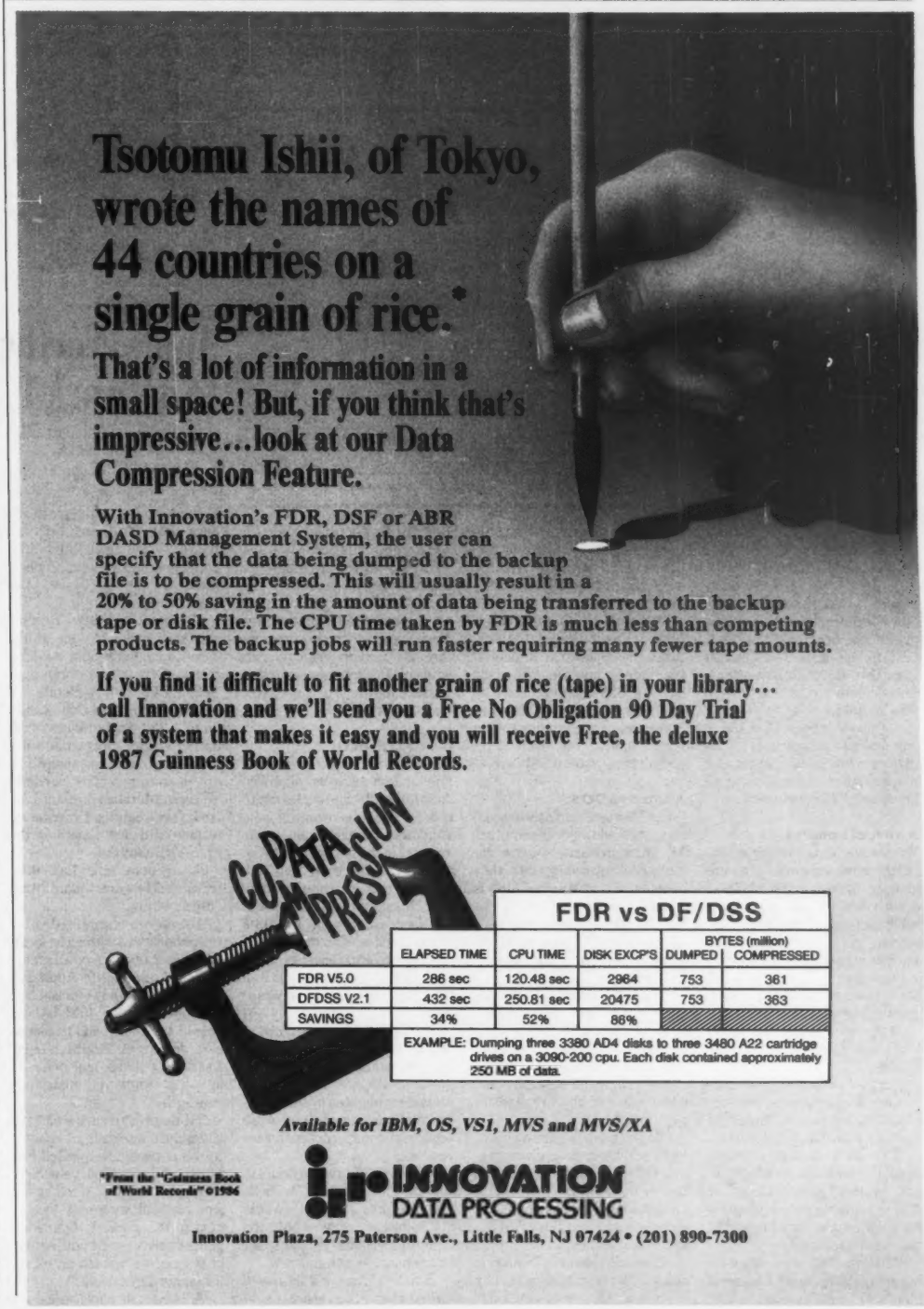
D-Net will be discontinued once Inforeach becomes generally available, a spokesman said. Current D-Net users can upgrade to Inforeach, he added.

"My initial reaction was that it was a 'me-too' product," said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y. "Oracle has a distributed product, Ingres is another, and now ADR is saying they have one," she said, referring to Oracle Development Corp. and Relational Technology, Inc.'s products.

"It sounds like the beginning of a distributed data base management system, but it still has to grow," she added.

Inforeach is made up of two major components, a distributed data manager (DDM) and a communications facility. The DDM manages access to multiple data bases, while the information transmission manager handles the data communications and supports IBM's System Network Architecture, LU6.2 and channel-to-channel connections.

The DDM includes the requirements for a distributed environment, ADR said.


Tsotomu Ishii, of Tokyo, wrote the names of 44 countries on a single grain of rice.*
That's a lot of information in a small space! But, if you think that's impressive...look at our Data Compression Feature.
With Innovation's FDR, DSF or ABR DASD Management System, the user can specify that the data being dumped to the backup file is to be compressed. This will usually result in a 20% to 50% saving in the amount of data being transferred to the backup tape or disk file. The CPU time taken by FDR is much less than competing products. The backup jobs will run faster requiring many fewer tape mounts.
If you find it difficult to fit another grain of rice (tape) in your library... call Innovation and we'll send you a Free No Obligation 90 Day Trial of a system that makes it easy and you will receive Free, the deluxe 1987 Guinness Book of World Records.
DATA COMPRESSION
FDR vs DF/DSS
ELAPSED TIME
CPU TIME
DISK EXCP'S
BYTES (million)
DUMPED
COMPRESSED
FDR V5.0 286 sec 120.48 sec 2984 753 361
DFDSS V2.1 432 sec 250.81 sec 20475 753 363
SAVINGS 34% 52% 86%
EXAMPLE: Dumping three 3380 AD4 disks to three 3480 A22 cartridge drives on a 3090-200 cpu. Each disk contained approximately 250 MB of data.
Available for IBM, OS, VS1, MVS and MVS/XA
*From the "Guinness Book of World Records" ©1986
INNOVATION DATA PROCESSING
Innovation Plaza, 275 Paterson Ave., Little Falls, NJ 07424 • (201) 890-7300

Rodime trumpets faster PS/2 drive

BY ED SCANNELL
CW STAFF

BOCA RATON, Fla. — Rodime, Inc. last week announced a 45.5M-byte, 28-msec hard disk drive for IBM's Personal System/2 Model 50 that will be sold to corporations and dealers as a replacement for the 20M-byte, 80-msec drives currently used in the IBM system.

Rodime is including a kit with the drive that it said allows users and dealers to remove the original drive from the Model 50 and install it in either the PS/2 Models 25 or 30. The drive — called Double Play — and installation kit carry a dealer price of $899.

Some MIS managers welcomed the substantially faster drive for the Model 50, but most said they would have to evaluate the product before committing to buying it in large numbers.

"We wouldn't make any decisions until we evaluate it to see if it performs as advertised," said Jim Appleyard, manager of data security and controls for Duke Power Co. in Charlotte, N.C. "It sounds like a good idea, though."

Rodime officials said a major advantage of Double Play is that it allows users to upgrade their Model 50s and 30s using just one upgrade kit. However, some MIS managers said they would have little use for the Model 50's 20M-byte drives because they have few or no Model 25s or 30s to use them with.

"Most of what we are doing here is 286-based, so that rules out the Model 30s," said Robert Corr, director of technology planning for Electronic Data Systems Corp.'s Dealer Systems division. "I salute them for coming out with a drive IBM should have come out with, but I just don't have away to utilize it."

If only a trade-in

"I would be interested if they offered some sort of trade-in," said Jeff Ehrlich, manager of product technology for General Electric Co.'s Corporate Information Technology staff. "I think a lot of people are buying the [PS/2] Model 60 when all they really want is a better disk drive. So I think this [Double Play] is a good thing."

While the 3½-in. drive is compatible with the Model 50, it does not take advantage of IBM's proprietary Micro Channel architecture. Rodime declined to say when a version that supports that architecture would be available.

Double Play comes with cables, interface boards, controllers and brackets for installing it in the Model 50. Installation in the Model 30 is somewhat easier than in the Model 25, according to Jamie Bankhurst, manager of product development for Rodime's retail products, although he said the process on both is fairly routine.

"The first time you do it, it might take a half-hour, but after you have installed a few, you can do it in 15 minutes," Bankhurst said.

Full installation and partitioning software is included with the disk, which features automatic head parking and locking, according to a spokesman. The product has a mean-time-between-failure rate of 18,000 hours, he said.

The product is available immediately.

Opening wide

Microsoft's Windows/386 expands on capabilities of earlier versions and uses same interface planned for the Presentation Manager component of OS/2

	DOS Version 3 series + Windows	Windows/386	OS/2 with Presentation Manager
Multitasking	Limited (not preemptive) (no background execution)	Yes (preemptive) (background execution)	Yes (preemptive) (background execution) (time critical)
Memory	Single 640K-byte address space EMS* 4.0 expanded memory	Multiple 640K-byte address spaces EMS 4.0 expanded memory	16M bytes
CPU	8086/80286/80386	80386	80286/80386
User interface	Same	Same	Same
Protection	No	Yes, between virtual machines	Yes, between each task
Application support	DOS 3.0 and Windows	DOS 3.0 and Windows	DOS 3.0 and Windows in compatibility box OS/2

* Lotus/Intel/Microsoft Expanded Memory Specification

INFORMATION PROVIDED BY MICROSOFT CORP.
CW CHART

Windows

FROM PAGE 1

Health Care Corp., Windows/386 is apparently just the ticket. The firm, based in Deerfield, Ill., has some 180 Compaq Computer Corp. Deskpro 386s, many of which may benefit from Windows/386.

"To be able to use the 386 to run multiple programs is a shot in the arm for us. We can get a lot more productivity out of [these machines]," Heschel said.

A virtual handful

Windows/386 runs multiple MS-DOS environments simultaneously by using the 80386's 8086 virtual mode to set up a handful of virtual machines. Depending on a user's hardware and software configuration, each of these machines can run a full 640K bytes of memory for such applications as Lotus Development Corp.'s 1-2-3, Microsoft Word and Ashton-Tate's Dbase III Plus.

Because Windows/386 uses its own virtual machine, each application has 640K bytes of memory available.

The package will compete primarily with Quarterdeck Office Systems, Inc.'s Desqview 2.0, a popular control program for 80386-based machines that runs in character mode.

Windows/386 also supports Lotus/Intel/Microsoft Expanded Memory Specification 4.0, which allows the user to address more than 640K bytes of random-access memory (RAM). This specification is used primarily for large data sets.

Although the product is reported to be compatible with virtually any application, Windows/386 cannot operate with some existing 386 software, such as the DOS Extender by Phar Lap Software, Inc., according to Steven Ballmer, Microsoft vice-president of systems software.

A toast to DOS

While Microsoft officials conceded that Windows/386 and other MS-DOS products would eventually be displaced by OS/2, they maintained that Windows/386 is not a temporary product.

"Over time, there will be a transition to OS/2, but MS-DOS is definitely not going away," Ballmer said.

Some observers said the announcement gives a breath of life to the DOS world, which some developers appear to have turned their backs on in favor of the pending OS/2 Release 2 and a whole line of OS/2-related applications.

"It gives a new lease on life to DOS machines and gives programmers a reason to continue to stay in the DOS environment for some time," said Craig Cline, associate editor at Seybold Publications in Malibu, Calif.

This version of Windows, along with the announcement by Windows/386 co-developer Compaq that it will bundle the software with its 386-based systems, may also give Windows a much-needed boost.

While Microsoft has shipped roughly a million copies of Windows, many of which were done through bundling arrangements with OEMs, there is still a dearth of users and a lack of major applications for it.

No dearth here

The lack of Windows applications is less an issue with Windows/386, which provides multitasking and windowing of non-Windows applications. An increase in the popularity of Windows could also lay the groundwork for the Presentation Manager, Microsoft's graphical user interface component of OS/2 that is based on Windows.

The system requires 140K bytes of RAM, a hard disk and an IBM Enhanced Graphics Adapter or Video Graphics Array display adapter. Microsoft recommends at least 2M bytes of physical memory.

Vendor support for the product was highlighted by the attendance of more than 30 software vendors and numerous hardware vendors.

Windows/386 should be available on the 20-MHz version of the Deskpro 386 and on the 80386-based version of the Compaq Portable III, both set for announcement tomorrow.

Senior Editor Ed Scannell contributed to this report.

Apple, Northern Telecom to network 1,334 Mac IIs

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s strategic alliance with Northern Telecom, Inc. has once again borne fruit with three networking products slated to be introduced this week.

Apple and Northern Telecom said they will introduce at the Tele-Communications Association conference (see stories page 128) Lanstar Appletalk, a networking product that enables up to 1,334 Apple Macintosh II users to share information within a department or company. It is driven from a central Northern Telecom Meridian Lanstar controller and requires a Lanstar interface card that plugs into the Mac II's Nubus slot.

Also required are a Lanlink interface cable and standard twisted-pair wiring.

Users are connected over telephone wires and can be located up to 2,000 ft from the controller. According to Apple and Northern Telecom officials, the network provides 40M bit/sec. shared bandwidth and transmission speeds of 2.56M bit/sec. Lanstar Appletalk includes a diagnostic software application package.

"It doesn't require dialing or any human interface to connect to the network," explained Bob McNinch, business development manager at Apple. "Clicking the icon once allows a user to connect to the network. Instead of being a solution for a small group of people, we wanted an establishmentwide network."

All Appletalk applications are compatible with the new network, McNinch added. The price of the Meridian Lanstar controller is $5,400; the interface card is $295.

Bridge to PCs

Also to debut is Lanstar Appletalk Bridge, a software package extending the network to include all Macintosh personal computers and peripherals as well as PCs running Microsoft Corp.'s MS-DOS. Up to 31 Appletalk devices can be connected on each package. The software is resident on a Mac II connected to the Lanstar Appletalk network and Apple's Appletalk personal network or Farallon Corp.'s Phonenet.

The package's price is $295.

Appletalk Netaccess, priced at $595, is a software package for the Mac that allows remote users to access a network's file server, Apple's Laserwriter printer or electronic mail.

A Northern Telecom Meridian SL-1 private branch exchange provides the connection to the Appletalk network using a communications server. McNinch said the connection is transparent to the user. Transmission speeds are said to be 19.2K bit/sec.

Users from up to 8,000 ft away can connect to the network via a telephone jack, while those located farther away require a modem.

All products are scheduled to be available in 60 days through Apple dealers. According to McNinch, IBM Personal Computer versions of the products are currently available through Northern Telecom.

THE VM SOFTWARE SEMINAR

If your VM Systems Management seems shaky, check the foundation.

Ever notice how many great ideas in VM Systems Management topple over under the weight of reality?

Well, no wonder. Any structure built out of bandaids, baling wire, and *ad hoc* solutions is bound to become a bit creaky after a while. Especially when there's a population explosion in your user community.

Fortunately, it doesn't have to be this way. With the right foundation, the rest of the structure stays in perfect balance. Helping you through periods of explosive growth, while eliminating unforeseen problems along the way.

Getting the right foundation is surprisingly easy. And seeing one is even easier. We'll show you all the details at the VM Software Seminar.

COME TO THE SEMINAR THAT PUTS YOU IN CONTROL.

Each half-day Seminar is packed with specifics that will help you improve control over the VM environment—meeting management and user needs better than ever, while actually reducing system staff workload.

The Seminar focuses on five vital Systems Management issues: DASD, Production, Security, Operations, and Performance and Capacity. In each case, you'll see how the right foundation can make all the difference—illustrated by specific solutions discussed by fellow VM professionals.

You'll also have a chance to talk with other VM managers, to see how handling situations similar to yours. And not least of all, you'll learn about VMCENTER II, the world's first and only comprehensive Systems Management package for the VM environment.

It's an extraordinary event. Yet it costs you nothing. In fact, there's even a free lunch.

So don't delay. Enroll today. And get *your* Systems Management house in order—before it's too late.

SEMINAR DATES AND LOCATIONS

Albany, NY November 17	**Denver, CO** November 2	**New York City, NY** October 6	**San Jose, CA** November 4
Boston, MA November 16	**Detroit, MI** October 5	**New York City, NY** November 10	**Seattle, WA** October 23
Cherry Hill, NJ November 9	**Edmonton, AB** October 22	**Omaha, NE** October 27	**St. Louis, MO** October 28
Chicago, IL October 26	**Houston, TX** October 16	**Research Triangle Park, NC** October 13	**Tampa, FL** October 14
Cleveland, OH October 29	**Indianapolis, IN** October 1	**Rochester, NY** November 18	**Toronto, ON** October 7
Dallas, TX October 15	**Los Angeles, CA** November 3	**San Francisco, CA** November 5	**Washington, DC** November 19

1800 Alexander Bell Drive
Reston, VA 22091

VM SOFTWARE INC.

RESERVE YOUR PLACE TODAY

(800) 562-7100 OR (703) 264-8000

(Attendance by a software vendor or its representative is prohibited without prior written approval from VM Software, Inc.)
Copyright © 1987 VM Software, Inc.

1-CWX-870928

AT&T spells out net control plan

BY ALAN ALPER
and ELISABETH HORWITT
CW STAFF

NEW YORK — AT&T last week announced plans for a unified network management architecture that potentially would allow its customer-premise equipment and service offerings to be centrally controlled through any system that complies with the CCITT X.410 network management standard.

Unified Network Architecture (UNA) is based on the Network Management Protocol (NMP), an emerging CCITT and ISO standard that will also be compatible with the Integrated Services Digital Network. It would provide configuration and fault and performance management, among other functions, for customer-premise equipment, local exchange carrier network and AT&T interexchange services, AT&T said.

The architecture is expected to evolve during the next couple of years, AT&T said. The company intends to publish initial NMP specifications within the next few months.

By publishing the specifications, AT&T will, for the first time, allow third-party service and equipment vendors direct access to — and potentially control of — its equipment and service offerings, according to George Kushin, senior vice-president of marketing for T1 switch vendor Avanti Communications Corp.

"As we bring our own offerings under the CCITT standard, users will be able to control not only their T1 equipment but also AT&T services and [private branch exchanges]; or to use AT&T's UNA to configure their T1 equipment," Kushin said.

Avanti and Timeplex, Inc. both announced last week that they would support UNA in their T1 networking products.

AT&T spokesmen were unclear as to which of the company's existing networking and network management products will be brought under the UNA umbrella through X.410 interfaces and did not specify when or if the company intends to introduce network management products under the new architecture.

Analysts lukewarm

Analysts were less than enthusiastic about AT&T's network management architecture. "It's about three or four years late and far short of the capability the world expects of a company with AT&T's resources," said Ken Bosomworth, president of International Resource Development, Inc.

AT&T introduced two products that support its new network management architecture: a workstation to provide access to a variety of network management systems through a single system and a processor to monitor network traffic.

In its initial release, AT&T's Accumaster Consolidated Workstation will provide access to AT&T's Starkeeper network management system, Dataphone II system controller, Dataphone II Acculink Network manager, Accunet T1.5 customer-controlled reconfiguration and IBM's Netview, a system for managing data networks in an IBM Systems Network Architecture environment. The company said it expects to support additional network management systems over time.

The workstation is based on an AT&T 6300 Series microcomputer and uses Microsoft Corp.'s Windows as its user interface. For multiuser applications, the system can be configured as a file server on an AT&T Starlan local-area network.

It is scheduled to be available in the first quarter next year and costs between $7,000 and $15,000 per user, depending on the configuration.

The other product, Accumaster Trouble Tracker, is a Unix-based software system running on an AT&T 3B2 computer that reportedly monitors up to 400 System 75, System 85 or Dimension private branch exchanges on a network.

Polices performance

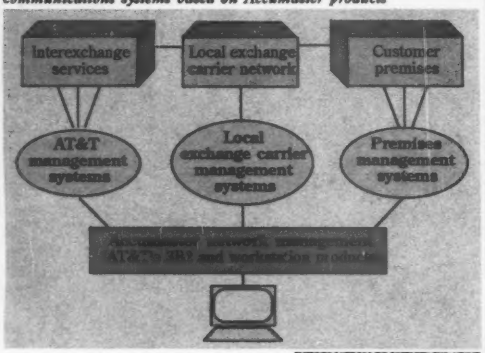
It oversees the performance by collecting alarms and issuing and tracking trouble tickets on alarms. Trouble Tracker also generates reports to help gauge equipment performance, spot developing problems and identify long-term trends.

Set to be available in the second quarter, a typical configuration costs $60,000.

As laid out last week, AT&T's UNA would link existing network management products, which monitor individual devices on the network. To integrate all management systems on the network, each would have to adhere to the NMP, noted Chuck Yates, AT&T's vice-president of marketing planning.

AT&T branches out

Network management scheme promises end-to-end user control of communications systems based on Accumaster products



INFORMATION PROVIDED BY AT&T
CW CHART

Justice Dept. scores Southwest Bell venture

BY KATHY CHIN LEONG
CW STAFF

WASHINGTON — A partial investigation by the Department of Justice has found that Southwestern Bell Corp. did violate the AT&T divestiture decree in its relationship with development company Tsunami Technologies Corp. However, until the study is complete, the Justice Department is not ready to recommend any type of enforcement action.

Southwestern Bell, which owns 80% of Sunnyvale, Calif.-based Tsunami, has been under fire since June, when the secret $11.8 million investment in Tsunami became public [CW, Sept. 7]. Tsunami is a research and development company working on a broadband local-area network with private branch exchange features.

U.S. District Judge Harold H. Greene later ordered the Justice Department to investigate the entire matter, which was initiated by former Tsunami official Don Marquart, who was terminated in August 1986.

The preliminary investigation findings claim "there were significant lapses in Southwestern Bell's compliances with the procedures mandated by Section V of the decree for informing [Bell operating company] officers and management employees about their decree obligations."

The section explains that each Bell holding company must give copies of the Modified Final Judgment and a written order to comply with the decree to "all officers and management personnel" who have large responsibility in Modified Final Judgment matters.

Southwestern Bell has admitted that new management employees of Tsunami failed to receive the needed documents but added that it has reinstituted the procedure required in Section V.

MAP group

FROM PAGE 1

group said the only changes allowed in MAP 3.0 will be corrections in the specification.

"There shouldn't be any negative impact for anyone," said Laurie Bride, Technical and Office Protocol (TOP) program manager at Boeing Computer Services in Seattle. The statement will not restrict vendors from adding new functionality to their products. "The only concern of the committee," Bride stressed, "is that the products be compatible."

Great expectations

"Right after Version 2.1 of MAP was announced, people were already talking about 3.0," observed Walt Kozikowski, a staff executive for the National Electrical Manufacturers Association in Washington, D.C.

Kozikowski, who represents the body of MAP vendors, said that vendors have been particularly disappointed in MAP 2.1 sales, which have been lower than anticipated, because of users' expectations of Version 3.0. "Now, users will feel much more confident when they are making their buying decisions."

According to Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Salem, Mass., $17 million to $21 million will be the flat amount of MAP sales in 1987 compared with last year. "The key to all of this has been the need for stability," Friscia said. "MAP has always been somewhat of a moving target. Freezing things at MAP 3.0 will give users a chance to move ahead and give vendors a chance to get a return on their investments."

Under the statement of direction, issued at the MAP/TOP Users Group meeting, MAP suppliers are urged to provide "mechanisms" for backward compatibility in upcoming products. The steering committee's initial review of product compatibility comes six months after MAP 3.0 is released.

TOP seeks compatibility

The move to make the MAP specification compatible with future releases has no bearing on TOP, but a stability statement is under development and is scheduled to be presented at another users group meeting in January.

According to Bride, the direction of TOP is to maintain compatibility with MAP and Government Open Systems Interconnect Procurement. Exactly what the stability statement will contain will need to be discussed with the National Bureau of Standards, she stated.

Also at the MAP/TOP Users Group meeting, a handful of vendors issued product announcements designed to round out their product lines.

Concord Communications, Inc. introduced a $10,200 bridge that links Ethernet IEEE 802.3 networks over an IEEE 802.4 broadband backbone. The Series 4200 bridge was designed for large manufacturing sites with multiple Ethernet segments. Concord officials stressed that the product can serve as a MAP/TOP bridge, since the device lets TOP workstations on 802.3 communicate with MAP broadband nodes.

In addition, Concord unveiled a program to help vendors participate in the Enterprise Networking Event '88 International, which is slated for June in Baltimore. The crux of the event is to demonstrate interoperability among different vendors' machines. The Concord Event Starter Kit will assist customers in migrating from MAP 2.1 to MAP 3.0 applications.

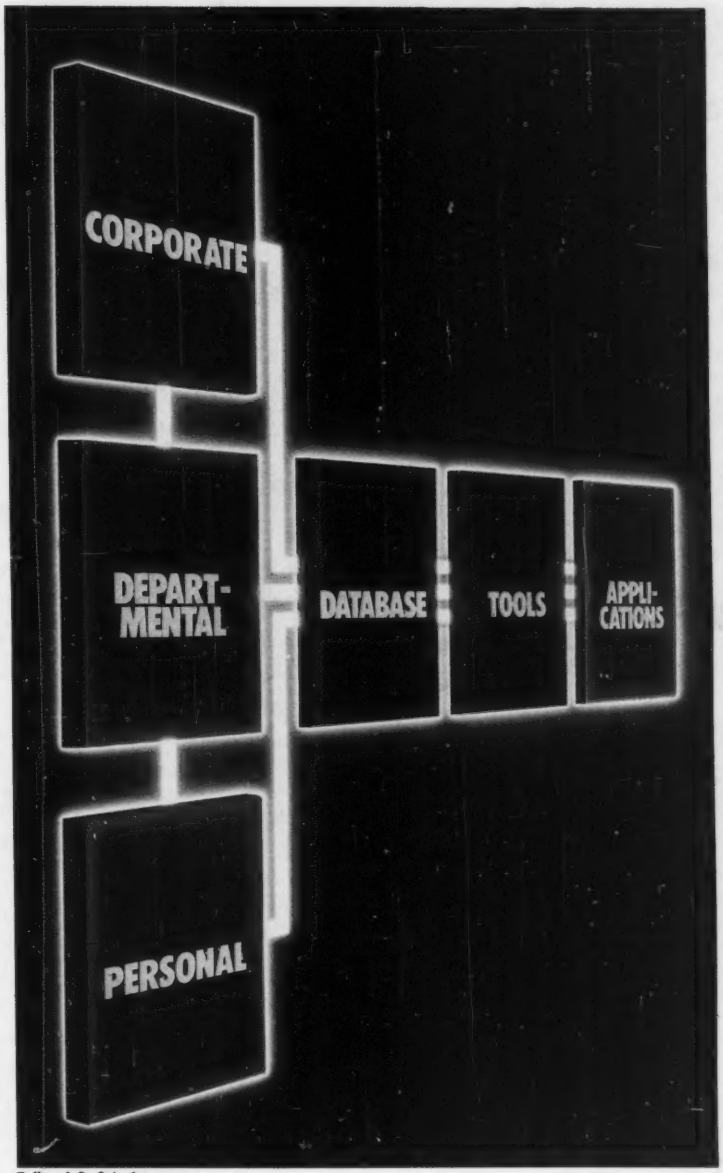
In the wake of Version 3.0, Motorola, Inc.'s Microcomputer Division has dropped the price of several of its MAP products. The most dramatic reduction is the 40% price cut of its flagship product, the MVME732 Advanced MAP controller board. The 32-bit board using the MC6884 Token Bus Controller chip will reportedly be sold for $1,595.

The Motorola Semiconductor Products Division announced an enhanced Token Bus Controller and a price drop for its existing Token Bus Controller. In large quantities, the price for a single unit will be as low as $35 by the fourth quarter, the company said.

Fairchild Data Corp. recently introduced a low-cost 802.3 modem for use in TOP networks. The 10M bit/sec. modem, TOPlink M8023, features single or dual cabling capabilities and costs $2,995.

ACCESS THE TECHNOLOGY ONLY CULLINET CAN PROVIDE.

ACCESS 3X3.



Cullinet's 3x3 Architecture.

Cullinet's 3x3 is much more than an architecture. It's a means of integrating all of your company's information resources. Our approach provides for the integration of three sets of software products – databases, development tools and applications – and their connectivity across three distinct computing environments – corporate mainframes, departmental systems and personal computers. It's working and working hard for more and more corporations worldwide.

Throughout the past year, Cullinet has told the stories of companies that have found total solutions to their business problems within this three-tiered offering of information management software and productivity tools. Cullinet's broad product line includes IBM® compatible software as well as software for Digital VAX™ systems and other departmental platforms. And our database products, productivity tools and fourth-generation business applications feature embeddable artificial intelligence and have been designed to allow the utilization of voice-response technology.

Integration is the bottom line. And Cullinet has consistently improved the bottom line for companies that have purchased our applications for manufacturing, project management, distribution management, finance, banking and human resources. By reducing implementation costs, increasing productivity and ensuring that the right information gets to the right people at the right time, Cullinet has enabled its customers to run their businesses as single integrated enterprises.

Find out more about the *one* software company that can link solutions and deliver critical applications to every level of your organization. Call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet®

An Information Technology Integrator
For The 80s, 90s And Beyond.

IBM is a registered trademark of International Business Machines. VAX is a trademark of Digital Equipment Corporation. The Cullinet logo is a registered trademark of Cullinet Software, Inc. © Copyright Cullinet Software, Inc. 1987.

Storage Tech boosts solid-state disk power

BY JAMES CONNOLLY
CW STAFF

LOUISVILLE, Colo. — Storage Technology Corp. last week quadrupled the capacity and expanded the communications options available on its solid-state storage devices for IBM and IBM-compatible mainframes.

With the introduction of the 3G-byte 4380 Solid-State Disk Subsystem, Storage Technology surpassed the 2G-byte storage capacity provided by competing devices from Hitachi Ltd. and marketed in the U.S. by Memorex Corp. and National Advanced Systems Corp.

The 4380 is comparable to the Hitachi units and to a 512M-byte Amdahl Corp. solid-state system, said Grant Wilcox, solid-state disk product manager for Storage Technology. "The performance, functionality and reliability are pretty much identical. What we offer is that we have been in the solid-state business for nine, going on 10 years now," Wilcox said.

Page and swap

The channel-attached solid-state devices emulate IBM 3380 disk subsystems for applications that include paging and swapping. Wilcox claimed the 4380 provides seven to 10 times the performance of a conventional rotating disk system. The solid-state devices store data on memory chips rather than magnetic disks.

While the 4305 — the first versions of which were shipped in 1979 — provides 768M bytes of storage, the 4380 stores 3G bytes of data and instructions on 1M-bit chips. The 4380 features standard dual-port and optional quad-port capabilities. The dual-port feature allows two directors, two channels and two storage modules to run simultaneously.

The quad-port option allows four directors, four channels and four storage modules to run at once. The 4380 supports 16 channels, compared with the 4305's eight channels.

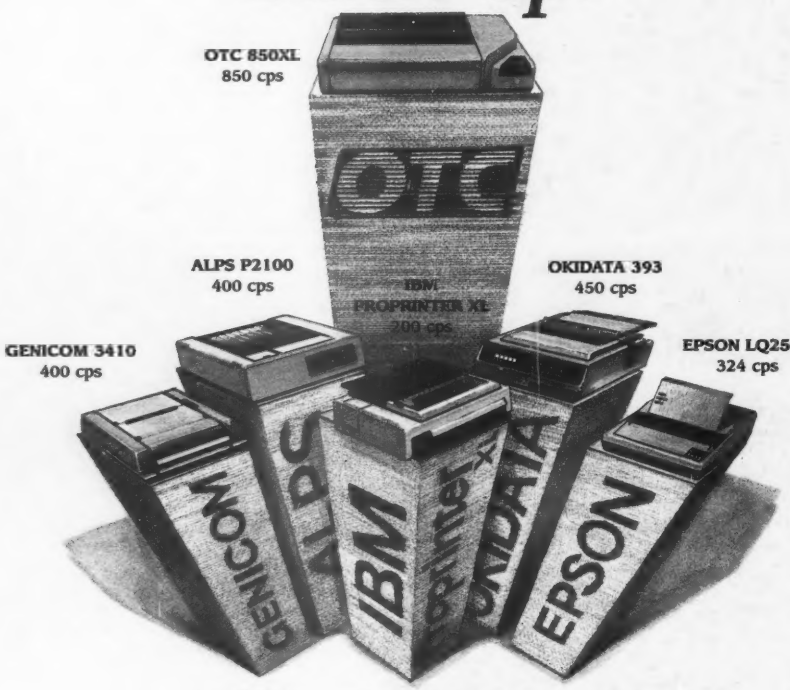
The 4380 also features Storage Technology's first battery backup. The feature was designed to preserve stored information throughout a one- to three-hour power failure.

Wilcox said the quad-port option could double throughput for some users, with applications such as swapped data sets and CICS temporary storage achieving the greatest benefit.

A minimum 48M-byte 4380 configuration with a controller costs $204,000. A system with two controllers, two backup units and 768M bytes of storage costs $971,000.

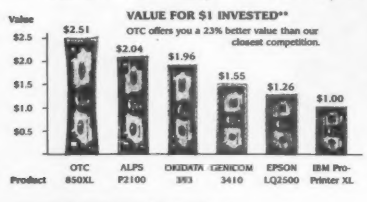
Versions with up to 768M bytes are scheduled to be shipped during the fourth quarter.

The Others Just Don't Stack Up!



Tall claims. Many companies say they offer the fastest printer with the best value for your money. At OTC, we decided to challenge those claims . . . and we won! We clearly deliver more throughput for your money.

We took five competitors and ran a Lotus™1-2-3™ spreadsheet under the exact same conditions, to let you be the judge.* The OTC 850XL delivered a throughput 58% higher than its closest competition. Sure, it's easy to make tall claims. But the others just don't stack up to Output Technology!



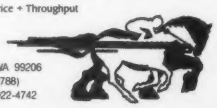
Take a good look at who's standing tall above the rest . . . call OTC today!

1-800-422-4850

*All printers run in 10 cpi, 6 lpi, 136 columns. Contact OTC for full benchmark details.
GENICOM is a trademark owned by Genicom Corporation.
ALPS is a trademark owned by Alps America, Inc.
OKIDATA is a trademark owned by Okidata Corporation.
EPSON is a trademark owned by Epson America Corporation.
IBM is a trademark owned by IBM Corporation.

**Value = Retail Price ÷ Throughput

OTC OUTPUT TECHNOLOGY CORPORATION
E. 9922 Montgomery, Suite #6, Spokane, WA 99206
(509) 926-3855, 800-4-OUTPUT (468-8788)
Telex #15-2269 OUTPUTSPOK FAX #922-4742



See us at PC EXPO/Chicago Booth #130

Infomart opens CIM plant doors; not yet at 100%

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — After a two-month delay, Infomart is slated to officially open its computer-integrated manufacturing (CIM) facility this week.

However, all the pieces that make up Infomart's Integrated Display of Enterprise Automation Center (Ideacenter) are not in place. Ironically, the Ideacenter was designed to further the concept of CIM, which integrates all facets of a manufacturer's business, but the facility has not had an easy time putting all of its components together.

This week's kickoff, for instance, will not include the center's "mini factory," which is intended to be a live CIM display in which products are actually built, said William Parmelee, Infomart's director of manufacturing and engineering markets. The mini factory is not expected to be online until early next year.

Another major component of the Ideacenter involves teaming up major manufacturing associations that can host seminars and exhibitions at the Dallas facility. So far, no major shows have been booked, according to Parmelee. The Society of Manufacturing Engineers (SME) hosted a regional show at Infomart last week, but the complete Ideacenter facilities were not available to the group.

However, Parmelee said negotiations are under way with SME, as well as with the American Production and Inventory Control Society, for exhibitions in the future.

Slow, million-dollar start

"Ideacenter is a fairly novel concept," Parmelee said. "When you're investing over a million dollars, you want to do it the right way. . . . The center is coming online this month. We are pulling the elements together."

Despite its slow start, industry observers said they expect the Ideacenter to be well received by manufacturers.

"Trade shows tend to be zoos," said Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Salem, Mass. "People need a place to go where they can at least take the steps to learn about CIM."

TRY ORACLE'S $1295 SQL DBMS FOR ONLY $199 TODAY. OR ORDER VAPORWARE.

If you're looking forward to OS/2 and the next generation of PC database management systems to enable you to build larger, higher-quality PC applications, you'll be interested to know that:

- Ashton-Tate has announced its intention to replace its outdated database technology with a SQL DBMS under OS/2, and
- IBM has announced its intention to offer SQL for OS/2 in its Extended Edition.

All you have to do is wait. Wait for OS/2 and SQL. Wait until mid-1988...or later! Meantime you keep developing with soon-to-be obsolete dBASE™ technology.

But you don't have to wait for SQL on the PC.

Oracle has it now. And you don't have to wait for OS/2 to run programs larger than 640K. The ORACLE® DBMS allows you to run OS/2-size programs under today's MS-DOS™.

ORACLE is the number-one selling DBMS on both minicomputers and mainframes. If you try PC ORACLE, we think you'll make us number-one on PCs, too. That's why we're making you this special offer.

We've sold thousands of copies of PC ORACLE for $1295. But now, for a limited time, we will send you the same, full-function version of ORACLE for only $199.*

That's right. Only $199 for a PC SQL DBMS that is identical to the ORACLE that runs on minicomputers and mainframes. $199 for the *only* PC DBMS that lets you write larger-than-640K, OS/2-size programs and run them under today's MS-DOS.

ORACLE makes it easy to write large, high-quality applications using industry-standard SQL. Applications that run faster. Applications that are easier to use and have more capability. Multi-user, networked applications. Applications that can be developed on MS-DOS today, and then run unchanged on OS/2, minicomputers and mainframes.

So stop writing dead-end dBASE code today. And stop writing cramped, limited-to-less-than-640K applications. Call 1-800-ORACLE1 today. Or use the rightmost coupon. Or mail one of the other coupons. And wait.

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-ORACLE1 today.

Dear Ashton-Tate,

2500 Cardiac Avenue
Torrance, CA 90502

Since you're announced your intention to go to SQL, I really don't feel as if developing obsolete applications in dBASE. I have every confidence your next attempt will be full-featured and well-designed and me what I've got, when you get it.

Dear IBM,

Old Orchard Lane
Armonk, NY 10504

Enclosed is a blank check. I keep reading that you've already announced that you're going to announce SQL for OS/2 and the Personal System/2. When you do, fill in the check amount. Hope to hear from you sometime in the next couple years.

Dear Oracle,

PC ORACLE • Oracle Corporation
20 Davis Drive • Belmont, CA 94002

I want to run OS/2 ORACLE on MS-DOS today. I agree to use this license only for application development.
Send me *(check only one)*:

☐ PC ORACLE $199
☐ ORACLE + 1MB Extended memory $599
☐ ORACLE + 2MB Extended memory $799

I'm paying by ☐ Check ☐ VISA ☐ MC ☐ AMEX

Print Name _____ Date _____
Company _____ Title _____
Street _____
City _____ State _____ Zip _____
Credit Card Number _____
Card Expiration Date _____
Signature _____

IBM slow to remedy leaky DB2 security

BY JEAN S. BOZMAN
CW STAFF

IBM will remedy design flaws in its DB2 relational data base management system that are slowing down the product's acceptance in the end-user community, industry analysts said last week. But the DB2 enhancements, which may be delivered under the banner of SAA Security Services, are not expected to be introduced for 18 to 24 months, analysts said.

IBM's anticipated actions will come in response to user requests for greater DB2 security at recent meetings of IBM's Share and Guide users groups. Meanwhile, many users have forged ahead with DB2 implementation, writing their own security extensions.

"We have known about the security problems since we got DB2 in early 1986," one Chicago user said. "But we have tried to work around the problems. Meanwhile, we hear that IBM is planning to add additional security in future releases."

"IBM is aware of security flaws in DB2," said Richard Finkelstein, vice-president of the Midwest region for Codd and Date Consulting Group, Inc. in San Jose, Calif. "These problems are not only slowing down the use of DB2, but in some cases, they are preventing DB2 from being installed at some large sites."

Audit trail difficulties

One major drawback, Finkelstein and others say, is that it is extremely difficult to create an audit trail within DB2. This often spells opposition to DB2 installation from a corporation's electronic data processing auditors. Beyond that is a series of security problems stemming from DB2's innate user friendliness and ease of access. Among them are the difficulty of restricting on-line access to DB2 tables, protecting user IDs and the ability to check the patterns of access by any individual or end-user department.

"DB2 is useful for queries from a single department or work group," said Steven Campbell, data base analyst for Public Service Electric & Gas Co. in Newark, N.J. But in a corporation with multiple work groups and multiple sites, securing the system may prove a challenge.

The security flaws are related to DB2's intended ease of use. DB2 was designed to make individual access by query easy, but in production systems with critical applications, easy access could result in security breaches.

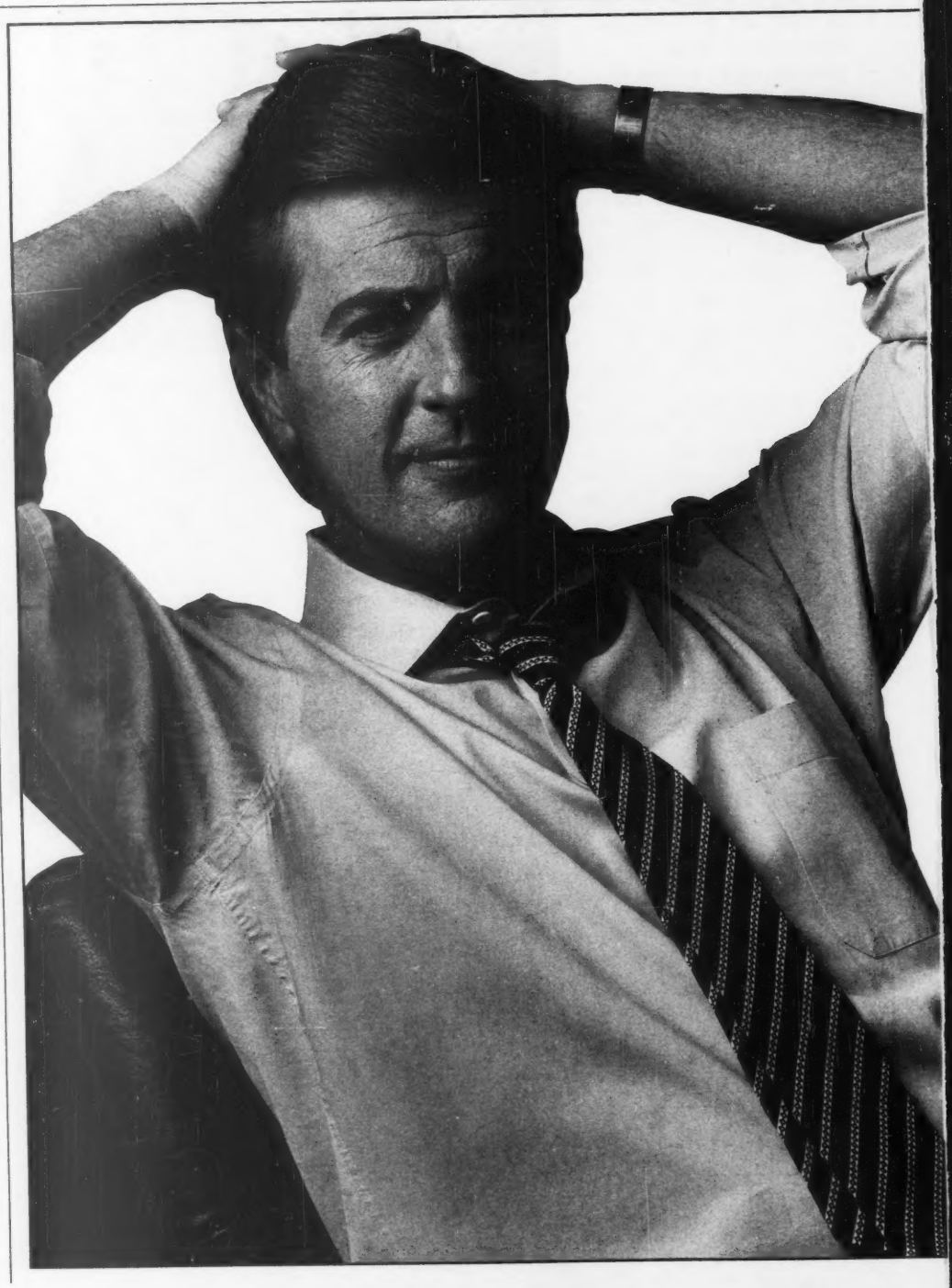
In general, Public Service Electric & Gas prefers to let individual end users read or browse through DB2 tables rather than to allow them to update tables, Campbell said. "We don't let anybody do anything on-line. We have one authorization ID in the data base administration group, and we do everything in batch."

Some early users of DB2 did not discover the security flaws until the system had been used for months. Speakers at a Chicago conference on the Control, Audit and Security of IBM Systems held earlier this month urged users to carefully assess their security goals and to institute housekeeping measures until IBM can remedy the DB2 security problems.

IBM intends to add a layer of security through a future release of the firm's Systems Application Architecture (SAA) software, according to Michael Braude, vice-president of Software Management Strategies at the Gartner Group, Inc. in Stamford, Conn. "We believe that sometime in the next two years, a solution called Security Services will surface within SAA," he said. "It will run in parallel to DB2's SQL and Query Management Facility," Braude said, but he offered no further details.

The move would be part of an

Continued on page 13



Users see flaws in audit trails, access authority

IBM's DB2 was shipped with more built-in security features than DL/1, the widely installed data base structure used with IMS. And yet, users say, certain features of DB2 could hamper corporate security.

According to users and industry analysts, security weaknesses of DB2 include the following:

- DB2's catalog shows what data is present in the current version of the data base but leaves no historical record, thereby making it difficult to establish an audit trail.
- Update authority cannot be granted to entire groups of users. Users or programmers who have been given update authority so they can back up the data in DB2 also gain the ability to change that data.
- A valid TSO identification, if used as part of an end user's access number, will grant data base privileges irrevocable by the data base administrator.
- IBM's RACF, which is widely used to ensure security in mainframe systems, can control only external access to DB2 from other mainframe facilities, such as IMS or TSO. It makes a poor fit with DB2's built-in security systems, analysts say.

No change has been made to DB2's built-in security features since the product was shipped to customers in early 1985, said Tom Sawyer, senior consultant with Codd and Date Consulting Group, Inc. located in San Jose, Calif.

The latest release of DB2, Release 3.0, came out this July, "so I'm not looking for anything new in security for the next 18 months," Sawyer said.

The lack of comprehensive security for DB2 apparently does not trouble Dale Kutnick, executive vice-president of research at the Gartner Group, Inc.

"By the time people start using DB2 significantly in mainstream applications, IBM will fix the problem," Kutnick said.

JEAN S. BOZMAN

Slow remedy

FROM PAGE 12

overall scheme to add security to all SAA systems. "IBM intends to provide security facilities to all SAA-compliant entities," Braude said.

Only IBM can make some of the security changes, said Tom Sawyer, senior consultant with Codd and Date. "The ability to create an audit trail definitely has to come from IBM's Santa Teresa [Calif.] DB2 facility," Sawyer said. "That's because the data you're talking about getting at is data that only the data base management system knows."

Third-party solutions exist to cope with some of the problems, but most attack only one facet of security, Sawyer said. A product from Waltham, Mass.-based DBview, Inc. allows data base administrators to assign objects and people to different groups, Sawyer said. Another solution, offered by BMC Software, Inc. in Sugarland, Texas, regenerates all object relationships when a DB2 table is changed.

Some simple housekeeping rules can stave off security problems until IBM can solve them, Sawyer said. "The first line of defense is that you control who gets update authority," he said. "And you can use views to 'fence' things in. That way, end users can't see everything in the DB2 tables — just the data they are allowed to see."

WE'VE GOT WHAT YOU NEED

Relax. You'll be in control with unequaled performance from the nation's largest, independent computer service organization. In fact, under many programs Intelogic Trace **offers guaranteed response times.**

IT provides high quality, dependable service around the clock for a host of micro and mini computers, peripherals, communication devices and LANs.

IT is not a subsidiary of a manufacturer or larger corporation. Independence makes us better because service is our only business and customer satisfaction is our primary goal.

Get the peace of mind you deserve. Call **IT** at 1-800-531-7186.

We are IT℠

The largest, independent single source for computer support and service.
1-800-531-7186
Turtle Creek Tower I
San Antonio, TX 78229
(512) 699-5700

INTELOGIC TRACE, INC.

IT is the registered trademark of Intelogic Trace, Inc.

MANAGEMENT REPORTING/RETRIEVAL CAPABILITY
for THE IBM S/38
For more information Contact Charles White at:
michaels, ross & cole, ltd.
800 West Roosevelt Road
Building E, Suite 304
Glen Ellyn, IL 60137
(312) 790-5040

Cullinane says farewell to Cullinet

Will assist Dukakis in presidential bid; plans for new company fuzzy

BY CLINTON WILDER
CW STAFF

BOSTON — With the company he founded experiencing losses but claiming to be on the mend, John J. Cullinane last week officially departed as chairman of Cullinet Software, Inc.

Cullinane's exit came with little ceremony at the end of the Cullinet annual meeting, which was marked by financial analysts' questions about the company's recovery strategy. Cullinane, 52, said he was relieved to be moving on.

"It will be nice to just have the chance to think about some new things," he said after the meeting. "People ask me if I'll miss having the reins, and I've been telling them that it's more like I've been pulling the wagon."

Last week's passing of control to new Chairman David Chapman was more of a change in title than anything else. Cullinane will essentially continue the same role he has played at Cullinet for the last several months, working two days a week at the company and visiting key customers and prospects.

> "IT WILL be nice to just have the chance to think about some new things."
>
> JOHN J. CULLINANE
> CULLINET SOFTWARE, INC.

Cullinane will be the keynote speaker at Cullinet User Week, which begins tomorrow in Anaheim, Calif.

"I'll continue to be a sounding board, an advisor and a suggester," he said. Cullinane will move his office out of the firm's Westwood, Mass., corporate headquarters to another Cullinet facility in the neighboring town of Dedham.

New business uncertain

Although Cullinane had indicated he would start a new company outside the computer industry [CW, May 4], he was much less clear on that last week. "To be honest, I don't even know what I'll be doing with that," he said.

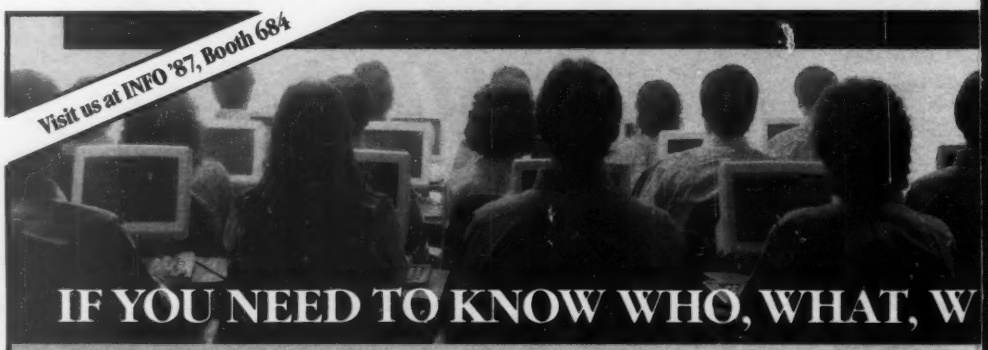
A sizable chunk of Cullinane's time will be devoted to advising Massachusetts Gov. Michael S. Dukakis, a longtime ally who has vaulted near the top of the Democratic presidential race since Cullinane announced his decision to leave the company last spring.

"Dukakis is interested in how he can be more responsive to the business community, and he sees me and others as sources of input," Cullinane said. "I'd like to see him work for entrepreneurial development zones and changing our financial reporting system to a longer period. The Japanese system of reporting once a year makes more sense. Three months is a bizarre window."

Cullinane, who founded Cullinet in 1968, hinted that he might sell part of his two-million-share stake in the company. "I haven't sold any in five years, so I have to decide what I might do there," he said.

The often-controversial executive said he will be devoting time to fund-raising efforts for the John F. Kennedy Library Foundation and Northeastern University, his alma mater.

GEOFF O'CONNELL
John Cullinane



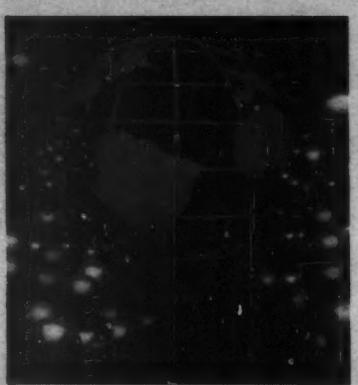
BASIS®
Text Information Management System

BASIS was the first software system developed specifically for the storage and retrieval of large volumes of textual information. Today, with over 800 installations worldwide, BASIS remains the ultimate Text Information Management System (TIMS) available. Anywhere.

Design flexibility makes BASIS software the ideal TIMS for diverse information management needs.

From the boardroom, to the newsroom, BASIS' modular design offers flexibility in tailoring the application to the need. Which is why BASIS has helped automate corporate and technical libraries, research and development projects, law offices, government departments and agencies, financial and insurance companies, publishing concerns, educational institutions, manufacturing companies, and primary resource industries.

In fact, there really isn't much BASIS can't do when it comes to text information management. BASIS' system provides fast, efficient access to textual [illegible]



BASIS ENABLES TEXT AND DATA RETRIEVAL FROM A GROWING WORLD OF INFORMATION. SIMPLY. QUICKLY. EFFICIENTLY.

BASIS is designed to keep pace with your world of information, and, without the constraint of hardware dependence.

Because BASIS is portable, your applications can run on many computers, minimizing your hardware dependency as applications increase in size...an important consideration when you are evaluating software for your text information management needs.

As sophisticated as BASIS may seem, it remains a system that is simple to use.

Fast, efficient information retrieval is possible in even the largest databases. BASIS uses "fast path" indexing techniques, providing a simple, yet powerful query facility that makes complex searching easy. Novice and casual users may retrieve information and generate reports using menus and simplified command statements. Advanced users may compose freeform query statements and generate ad hoc reports using the English-like query and data manipulation language. BASIS' help facility operates at three levels of expertise—beginner, advanced and expert so you always have immediate access to assistance.

198[illegible]

Borland raises curtain on Quattro

Touts faster recalculation, delete and page-down speeds than 1-2-3

BY ALAN J. RYAN
CW STAFF

NEW YORK — Boasting up to a 15% improvement in overall processing time over the 1-2-3 spreadsheet, Borland International's $195 Quattro will be formally introduced here today. The spreadsheet reportedly offers quicker recalculation, delete-row and page-down speeds than 1-2-3.

Quattro, which has been under development for three years, is slated to ship in the fourth quarter. It offers intelligent recalculation, which allows users to view the effect of changes in the spreadsheet without having the entire spreadsheet recalculate itself.

"I have a spreadsheet with 1,100 rows in it," said Doug Cobb, president of The Cobb Group, a software journal publishing company in Louisville, Ky. "It takes perhaps 30 seconds in 1-2-3 to recalculate. But a lot of times, I'll only change one or two numbers.

"In Quattro, it will only recalculate based on the changes you've made," Cobb said.

Borland claimed that a recalculation of a cash-flow model of 5,000 cells would take 0.27 seconds in Quattro and 2.9 seconds in Lotus Development Corp.'s 1-2-3 Release 2.01.

In addition, Quattro's pricing compares with Release 2.01 of 1-2-3, which is currently listed at $495.

Other useful features that Cobb noted include customized menus, better graphics, transcript capability, enhanced functions and complete control over color in the work sheet. Users can create an unlimited number of macros with Quattro, compared with 27 macros using 1-2-3, he said.

More memory space

But with this increased functionality comes a demand for more memory space. "It takes a little more space than 1-2-3 because it does so many things," Borland President Philippe Kahn said last week.

"For the kinds of things it does, you'd expect Quattro to be two or three times bigger [than 1-2-3], but it is only 20% bigger," Kahn added.

Cobb said an additional function he would like to see in Quattro is spreadsheet linking. Kahn maintained that while spreadsheet linking will not be available in the first release, Borland plans to eventually support that function.

In a market so dominated by 1-2-3, Cobb said he thinks Quattro can hold its own.

"I think that there is enough price sensitivity that if [a vendor] were to bring out a product that is 100% 1-2-3 compatible plus has significant additional features and is only one-third the price of 1-2-3, I think you could move quite a few units."

Not a contender

Kahn emphasized that Quattro, which is not copy protected, will not compete against the installed base of 1-2-3 users.

"Quattro is the natural evolution of 1-2-3, but users don't have to choose this instead. The programs can work side by side," he claimed.

Borland said Quattro will be available for all major operating environments. Version 1.0 is a single-user program; a networked version is planned, the company said.

Quattro will support Intel Corp. 8086-, 80286- and 80386-based computers with support for Intel's 8087 and 80287 math coprocessors. It was also designed to take advantage of the Lotus/Intel/Microsoft Expanded Memory Specification Releases 3.2 and 4.0, according to Borland.

The three-disk program runs on 384K bytes of random-access memory on the IBM Personal Computer, Personal System/2 and compatible systems, the company said.

HERE, WHEN, OR WHY... HERE'S HOW:
BASIS systems are easily implemented, becoming quickly productive. And, that makes sense.
One of the best benefits of selecting BASIS for your TIMS is the ease with which BASIS can be implemented and tailored to your existing applications environment. And, as many MIS/DP managers have discovered, BASIS even provides applications opportunities for end users, thanks to BASIS' fully integrated applications development facilities. Once implemented, BASIS databases are easily modified without disrupting systems operations. New files and record fields may be added or changed without reloading data.
BASIS is accurate, efficient, and secure.
Password protection and privilege code access secure BASIS installations at the database, index, record and field levels, to satisfy the most particular confidentiality requirements of your database.
If you like what BASIS can do for TIMS, then you'll love what DM® can do for DBMS.
BASIS TEXT INFORMATION MANAGEMENT SYSTEM. HIGH TECH. IN TOUCH. VERY USER-FRIENDLY.
DM is the first relational DBMS with full-text handling capabilities integrated with complete database management facilities. DM provides superior integrity constraints, security features and maximum data independence for programmer independence in DBMS applications.
BASIS and DM are both products from the minds of Information Dimensions, Inc., a subsidiary of Battelle—since 1929, the preeminent independent research facility in the world.
This proud heritage is your assurance the BASIS and DM systems are truly representative of the most innovative development in software technologies available for TIMS and DBMS applications. And, Information Dimensions provides a network of marketing, technical services and systems support, with offices and personnel worldwide.
If you need to know who, what, where, when, or why... then call Information Dimensions, NOW.
CALL TOLL-FREE
1-800-DATA MGT
Information Dimensions, Inc.
a BATTELLE Subsidiary
BASIS and DM are registered trademarks of Information Dimensions, Inc.

Pyramid joins OLTP field waving Sybase flag

BY JAMES CONNOLLY
CW STAFF

MOUNTAIN VIEW, Calif. — Pyramid Technology Corp. today is scheduled to move into the on-line transaction processing (OLTP) market with the introduction of a family of Unix-based superminicomputers modified to run Sybase, Inc.'s relational data base management system.

Pyramid officials said in briefings last week that they are targeting segments of the OLTP market that need the high reliability but not the fault tolerance that companies such as Tandem Computers, Inc. and Stratus Computer, Inc. offer for uses such as automated teller machine networks and airline reservation systems.

Nick Tuttle, Pyramid vice-president for marketing, said the Pyramid RTP systems are designed for users in areas such as insurance, manufacturing and patient tracking in hospitals.

The RTP series is composed of five systems based on Pyramid 9000 reduced instruction set computers. Pyramid said that 40% of its systems are used in commercial applications, while 35% are used in software development.

The transaction processors were developed in a nine-month joint project that involved Pyramid and Berkeley, Calif.-based data base vendor Sybase. Sybase had already ported its SQL-based, transaction-oriented Dataserver and Data Toolkit to Sun Microsystems, Inc. Unix-based workstations and Digital Equipment Corp. VAXs running VMS.

Apple, PS/2 ahead

Sybase said it plans to move its data base to the IBM Personal System/2 through an agreement with Microsoft Corp. and to the Apple Computer, Inc. Macintosh.

Pyramid data base program manager Nancy Colwell said Pyramid continues OEM arrangements for other data base products, including those offered by Oracle Corp. and Relational Technology, Inc.

Pyramid claimed a sustained performance rating of 10 to 75 transaction/sec. on the TP-1 benchmark. The five RTP models correspond to full configurations of the 9000 series. Colwell said Pyramid conducted actual benchmarks on the RTP Model 100, the larger of two uniprocessors, and measured a performance range of 18 to 24 transaction/sec. She said other performance figures were estimated based on those figures.

One analyst briefed last week said Pyramid's hardware platform appears fast enough to run the Sybase system and noted that Pyramid is being realistic in expecting incremental business gains with the RTP products. "Everybody — at least the Unix vendors we meet — is talking about being in transaction processing, and Pyramid seems to be the only ones doing anything about it," said Kate Comiskey, program manager for Unix markets and strategy at International Data Corp., a Framingham, Mass.-based market research firm.

Tuttle said beta tests should be completed by the end of October and production shipments will begin then.

System prices range from $165,000 for the uniprocessor Model 50 to $675,000 for the four-CPU Model 400.

55,000,000
Workstations

By 1990, there will be 55 million workstations being used by 60 million white-collar workers in the U.S.*

FREE
NOMAD Seminar

Gain new insights for handling your user explosion, and find out why NOMAD is the fastest-growing 4GL in the industry.

Atlanta	10/8, 11/17
Cambridge	10/8, 11/17
Chicago	9/30, 11/5
Houston	10/6, 11/12
Los Angeles	10/1, 11/10
New York	10/1, 11/10
San Mateo	9/29, 11/4
Seattle	10/6, 11/12

For details, or to register call:

1-800-722-4274

MUST SOFTWARE INTERNATIONAL
Making 4GL a language anyone can speak.

*IDC Research.
MUST Software International, 187 Danbury Rd., Wilton, CT 06897
NOMAD is a registered trademark of UBS International Ltd.

You can't manage a bu don't leave your

It's not just how you manage your business, it's how you manage your business in the long run.

Specifically, if you're not managing information with a long-term strategy in mind, you might run into problems later on—problems that may be costly to resolve.

AT&T comes through with a full range of options to keep pace with your business.

Considering this notion, AT&T designed an "open-ended" approach to information management solutions. This gives you the freedom to use AT&T equipment with most other vendors' equipment—which means you'll avoid the problems that can come up when you're locked into just one vendor.

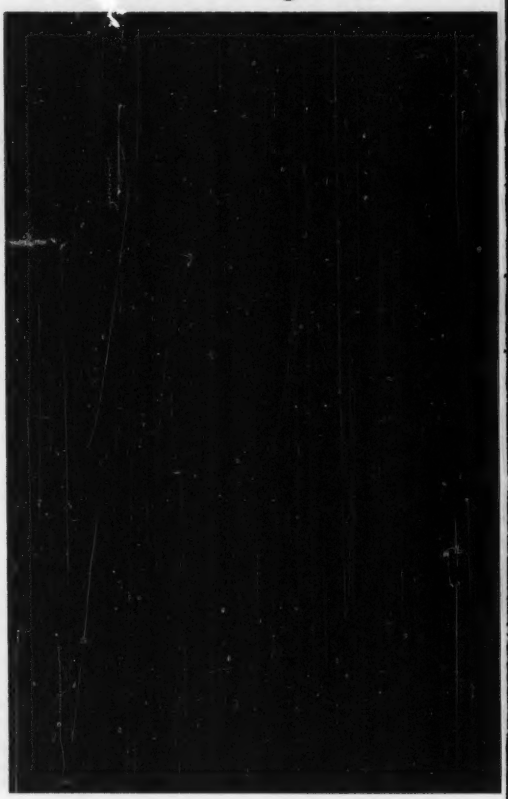
Chances are, you've heard other vendors talk about connectivity and flexibility, but the problem is, it's within their own system. At AT&T, we offer it from one system to another.

Since we take a communications-based approach, our design will allow you to move information around the world linking people, companies and continents. Therefore, it has the flexibility to offer you a variety of options to customize your information system as your business grows and changes.

With our communications expertise, we're able to extend communications control and the power of the AT&T Network into your own hands. Using an AT&T PBX and our departmental computer capabilities, our design will free your mainframe computers from managing communications—allowing them to do the tasks they were meant to do.

And to make service as efficient and complete as present-day technology will allow, you'll also have the capability of end-to-end network management.

In short, our open-ended solutions will allow information to be readily available and give you the flexibility you need to handle your business now and in the future.



So before you choose a company to manage your information networking needs, consider your options.

Because somewhere down the road, you don't want to find yourself painted into a corner.

For more information about our open-ended

© 1987 AT&T

Ridge aims to ruffle DEC, Sun with supermini

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — With plans to remain in the technical computing market and expand its value-added reseller channels, Ridge Computers, Inc. last week announced its most powerful superminicomputer to date.

Dubbed the Ridge 5100, the Unix-based multiuser machine represents the first in a family of high-end computers built under reduced instruction-set computing architecture that uses proprietary very large-scale technology. While the company already has two technical computers on the market, Ridge is pinning its hopes on the 5100 being the main breadwinner for the company once it ships — reportedly in February 1988.

And the system should turn things around. While Ridge has been in existence for seven years, it has yet to turn a profit. One of the firm's biggest shortfalls has been its lack of product visibility compared with competitors such as Sun Microsystems, Inc., according to Larry Lunetta, Ridge's vice-president of marketing. In addition, Ridge previously supported a proprietary version of Unix, which hampered market acceptance. Since May, it has supported AT&T Unix System V.

In its product announcement, Lunetta claimed the Ridge 5100 is 40% faster than the Sun-4 high-end technical workstations. Priced between $14,000 and $109,000, the Ridge machine will also be pitted against minis from Digital Equipment Corp., Hewlett-Packard Co. and IBM, Lunetta said.

Users getting cost-conscious?

"What we are selling is performance and price," he maintained. "Even companies that are not price-sensitive now will realize there comes a point where you simply don't have to pay that much for computing power."

According to Lunetta, a comparable DEC machine would cost $750,000. The 5100 features 144M bytes of maximum main memory and can support up to 128 users. It also reportedly provides users 26 months mean time before failures.

While the firm's sales force is selling to the technical marketplace, Ridge officials said they intend to expand their presence in other markets through value-added resellers. Lunetta said Ridge is close to signing its first U.S.-based reseller.

One of Ridge's key users, Pacific Data Images in Sunnyvale, Calif., said existing users will be tempted to migrate to the new system. One Pacific Data employee who praised Ridge's machine reliability said, "So far, the price and performance looks like a real winner in the market."

siness properly if you
options open.

information management solutions, talk with your AT&T account executive or, for the number of our office nearest you, call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

AT&T
The right choice.

Data Design to embrace micros

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Data Design Associates, Inc., a Sunnyvale, Calif.-based developer of mainframe financial software, last week announced the first in a series of new products aimed at opening up its software to personal computer processing.

DD-Paint reportedly allows users to design new mainframe on-line screens or customize existing ones on an IBM Pesonal Computer or compatible machine running IBM's PC-DOS or Microsoft Corp.'s MS-DOS. The screen and file information is downloaded to a desktop computer via DD-Link, Data Design's microcomputer-to-mainframe applications package.

The product, which was announced at a Data Design users conference here (see story page 24), is set to be released in the first half of 1988. Company officials would not disclose the price.

Screen and file changes made with DD-Paint are loaded back up to the host for use with such Data Design accounting products as General Ledger, Accounts Payable/Purchase Control and Fixed Asset systems.

Melding PCs, mainframes

The product is the vendor's first bid to integrate PC processing with its line of mainframe accounting software, according to Michael Kaiser, Data Design's director of research. Kaiser claimed that every Data Design mainframe product will eventually have a PC-based user interface similar to that of DD-Paint.

The plan is to anticipate the expected downward migration of Data Design's 700 customers toward microcomputers and distributed data processing. Instead of using dumb terminals that link many users to today's mainframes, Kaiser said, people will turn to powerful and intelligent desktop computers.

In a distributed DP environment, mainframe data is parceled out over a network of such micros. "The idea is to shift mainframe logic to the PC," Kaiser said.

Kaiser conceded that DD-Paint, with its need for downloading and uploading, does not carry out true distributed data processing. But he said the product takes the first step in porting Data Design's accounting software intelligence from mainframes to micros.

We know you couldn't care less about us.

Let's talk about the Memorex commitment to your complete customer satisfaction.

It could be that the only reason you're reading this ad is that your system is down.

And the last thing on your mind is a company called Memorex.

We know that.

And we'd like to change that.

So let's talk:

We know who you are. And we know your problems.

But who are we?

Well, aside from IBM, we're the only computer products company in the world to sell a *full* line of IBM-compatible computer products (everything from mass storage and communications equipment to System 3X peripherals, magnetic media and a host of other computer supplies).

But product selection is only the beginning of our commitment to you and your complete satisfaction.

For instance, we know that in terms of service, when you're down, you're losing major dollars and probably a lot of sleep. So when you're down, we're up. Our response time for critical system components is 2 hours or less. In fact, we take down time so seriously that many of our products, like the 3682 Disk Drives and 6880 Solid State Disk Drives are guaranteed to be up and running 100% of the time (Or the maintenance is *free*).

When it comes to parts availability, in nine out of ten cases that require a customer engineer to repair equipment (and we have over 2,000 of those talented people), the part is available in a nearby branch office. In 76 countries throughout the world. (The only continent we're *not* on is Antarctica.)

As for financing, let's just say we're extremely flexible and offer many innovative financing options. June 15 just may be a better day for you to make a payment than April 15th. We understand this.

Finally, we know that when you use us, on a scale of 1 to 10 you rate us an "8" on satisfaction with both our products and our service. That's good. But we're working on *improving* that figure.

We hope you're still listening.

Because we'd like to talk some more.

Simply dial 1-800-CALL-MRX and let us know how we can help you.

As we said, we know you couldn't care less about us.

Which is our whole point.

To know us is not to worry about us.

Let's talk.
1-800-CALL-MRX.

EDITORIAL

A taxing situation

Despite some recent setbacks, the concept of a tax on services — all services — is on the agenda in many states. This should be worrisome to the information systems industry, because major segments of this business are inherently service-oriented.

As in the past, state legislators are running amok, trying to fill coffers from any available source they feel won't turn around and vote them out of office.

The software sales tax and the sundry forms it took throughout the country is a classic example of out-of-control taxing authorities. The software sales tax became an issue in 1983 and 1984, when state governments began to feel acutely the double bite of federal cutbacks and voter tax-cut initiatives.

As states frantically searched for new revenue, they sought to tap sources they could count on for present and future taxes. They picked software because, as market research firms attested, sales growth was virtually assured for years to come.

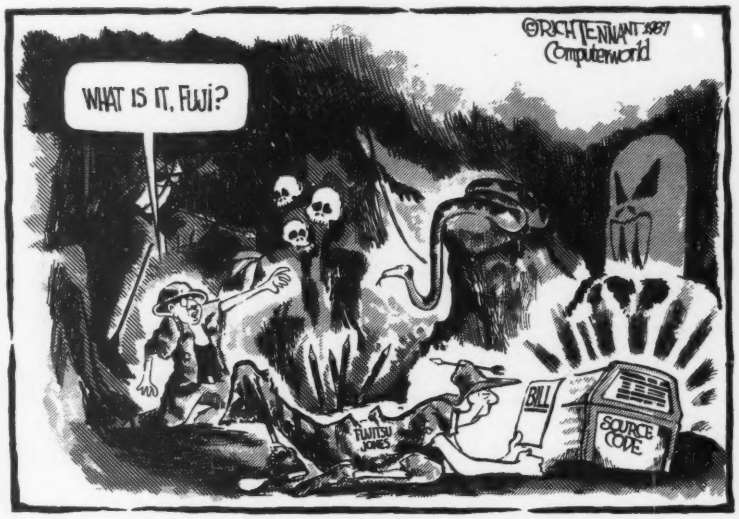
If the motivation behind the software sales tax was questionable, the execution of the various laws governing it was a black comedy. Some states tried to apply their sales taxes — reserved for "tangible" items — to custom software, claiming that the media on which the software is finally delivered is, indeed, tangible. Others taxed computer games differently than off-the-shelf business programs, and still others decided the matter was too complicated and made software exempt from sales tax.

The point is that the states attacked software, just as some now are launching attacks on services, for the wrong reasons: they are easy targets, and they ostensibly provide long-term growth in tax collections.

All this is not to naively point a finger at the states, which must increasingly shoulder the expenses formerly paid in part or totally by the federal government. However, underlying so many state tax programs is the arcane theory that passing the tax burdens to "outsiders," like software or computer service companies, is somehow more fair than taxing the state's inhabitants, even though they are the ones who consume the tax dollars.

Taxing — perhaps we should say overtaxing — outsiders is also pitifully shortsighted, as it can force these outsiders to take their business (and jobs) elsewhere. But in the world of two- and four-year terms of political office, this kind of tax is often the most politically expedient.

All this speaks for heightened vigilance by the ADAPSOs and CBEMAs of the world. It also speaks for commonsense tax policies from the federal government, which must recognize that the time has come to stop passing the tax collection buck and face some tough economic realities.



LETTERS TO THE EDITOR

CASEwork

Your editorial, "CASE advantage" [CW, July 27], proclaimed that "CASE is more glitter than substance" and "CASE technology is still primitive." While your characterization of this market segment was generally accurate, it lead the reader to the erroneous conclusion that there was no full-function computer-aided software engineering (CASE) solution available today, and the most promising efforts are ones that will interface disparate personal computer- and mainframe-based products from multiple vendors.

This overlooks Pacbase, an integrated, full life cycle CASE system used by major U.S. corporations to drive the development of their businesses' mission-critical systems. You might refer readers to an article in *Computerworld Focus* [July 8], which quoted CASE expert George Schussel as saying, "CGI's Pacbase is probably the closest to a true CASE system."

In addition, I am concerned by the editorial's suggestion that MIS departments go out and purchase hordes of PC-based design products that represent, in fact, only a small piece of the CASE picture. The benefits of CASE are only achieved when the concept is applied broadly to integrate the activities of all the personnel involved in applications development and maintenance.

As the CASE market explodes, let us keep our perspective. We are not developing technology for technology's sake — rather, we are trying to help U.S. businesses develop mission-critical systems to survive and prosper in an increasingly competitive environment and to help government organizations carry out increasingly complex missions in the face of budget reductions. It takes maturity to exploit CASE — purchasing a bunch of shiny workstations and calling it a day just won't cut it.

Charles H. Warhaftig
President
CGI Systems, Inc.
Pearl River, N.Y.

Ada revving up

"Ada drive stalling at DOD door" [CW, Aug. 31] is a classic case of looking at a glass that's half full and calling it half empty.

The "Ada glass" is not only half full, but rapidly filling to the brim, spurred by the recent Department of Defense prohibitions against ADA-use waivers, prohibitions that your "half-empty" article interpreted negatively. Instead, these new prohibitions are a clear and positive sign that many of the inevitable kinks inherent in new technology have now been worked out and Ada is preparing to go full speed ahead.

Everywhere I go in the defense and aerospace industry, I find Ada programs getting under way. I look at the same signs analyzed in your article and get a prognosis from users of an engine revving, not stalling.

We don't believe, for example, that Ada will be succeeded by a "Son of Ada" language by the mid-1990s. We do believe, however, that Ada will evolve naturally as any good language — any language that is going to survive — must do.

For over a year, many of us in the industry have been preparing for a major acceleration in Ada usage. And it's about to begin. We should, for example, see an immediate boost for Ada in October, as the first comprehensive computer-aided software engineering life cycle software development environments for Ada begin hitting the marketplace.

P. E. Borkovitz
Executive Vice-President
Advanced Technology International, Inc.
New York, N.Y.

This week in history

Sept. 26, 1977
A jury orders IBM to pay Forro Precision, Inc. $2.7 million in a verdict on Forro's charges that IBM interfered with its components business by making court depositions of former Forro employees testifying in another case available to customers.

Sept. 27, 1982
Three men are arrested and charged with conspiring to steal $3 million in modems and funnel them — possibly through Mexico — to the Soviet Union. Modems are one of a score of products that come under the embargo of American-manufactured goods to the Soviet Union, which was instated when the USSR declared martial law in Poland.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Riding shirttails to productivity

The information age will create high-quality, decentralized industries

JOHN BARNES

In most major industries, the word productivity is defined as "units of whatever you do per person-hour." Both the numerator and denominator of this ratio are often converted to dollars so that the statistic becomes dimensionless and can be compared with interest rates.

Management wants productivity increased — a person-hour costs a fixed amount, and management wants to get as much as possible out of it, whether it's trucks, keystrokes, loaves of bread or loan evaluations. Thus, in all the standard textbooks, the more productivity the better.

Not everyone has always looked at it this way. The ceiling of the Sistine chapel, as everyone knows, required several years to complete — and not mere person-years, but ultraexpensive Michelangelo years — yet no Vatican efficiency expert handed the artist a set of stencils and a roller.

According to studies that were done at the turn of the 20th century, the typical industrial worker owned just two shirts, each of which took a tailor four man-hours to make by hand.

Some modern machines can now turn out more shirts in a day than a skilled tailor in 1900 could produce in a year (and, remember, a standard work year at that time was 51 six-day weeks, at 12 hours a day).

Today, even minimum wage workers can afford a closet full of shirts. Of course, the work shirt of 1900 lasted 10 years and fit perfectly. (In fact, it lasted so long partly because it fit so well — very little strain on the seams).

'S, M and L'

For at least five of those years, the shirt was fit to wear to church. The modern shirt comes in "S, M and L," looks perfectly OK for perhaps 10 wearings and typically comes with a couple of flaws that the craftsman tailor of 1900 would never have permitted. However, you do get to have a lot of them — so productivity is higher.

Are we really so much different from our ancestors? Why do we pay so much money for handmade goods? Why don't Rolls-Royce and Mercedes-Benz automate more to increase productivity?

Because one unit is not always equivalent to another. A key, hidden component is information.

Until very recently, information was stored either directly in human memory or in forms that required human access — books, direction sheets, formulas, tables, yardsticks, sewing patterns, blueprints, molds, forms and dies.

The industrial revolution made materials cheaper and human labor more costly; an economist would say the point of optimum revenue on the production curve shifted toward capital intensiveness.

Less technically, we got more stuff by accepting dumber stuff.

Three sizes is much less information — thus making it cheaper to produce — than the 10 or 12 measurements the tailor took. More information requires more labor and thus more expense — compare the price of an architect-designed, custom-built house with a contractor stock model, for example.

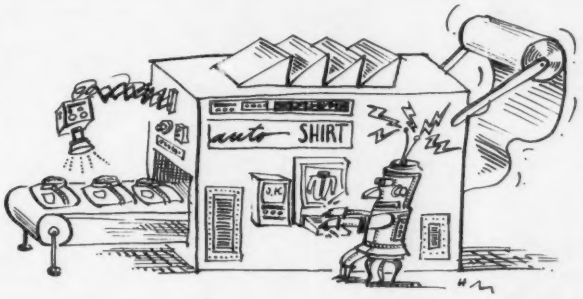
You can see it in the words we use to sell quality (or pretend that is what we're selling) — high-tech, designer, state-of-the-art, hand-crafted, gourmet. They all basically say, "Somebody who knows a lot put time into this."

However, the industrial revolution was the last revolution. The one going on now is making information cheap and accessible.

Let's look at that shirt one more time. Imagine this: You go to the neighborhood tailor, who takes your measurements and then helps you select a fabric and a shirt design.

Modern machinery

The tailor transmits these measurements, fabric specification, and design (along with your credit card number and address) to whichever manufacturer currently has the right price. Robots move a bolt of your fabric onto the line; another program adjusts the design to your measurements and feeds the description to the robot control modules.



HAL MAYFORTH

The shirt is then cut, sewn, safety-stitched and finished to fit you, then goes out in the mail. It's as fast as modern machinery, but as good as premodern handwork.

And not just your shirt — the same process could be done for tools, sporting goods, furniture and even your car.

This idea isn't pie in the sky, due to arrive on the same "someday" as nuclear fusion or the backyard helicopter. Theoretically, Microsoft Corp.'s Windows could support just such an operation. The big historical trend toward more and worse goods is about to reverse.

We shouldn't be surprised. Technological revolutions always transform the existing industries and create new ones. Mass production, for example, made the industry of agriculture big, centralized and capital-intensive. The information age will make mass production decentralized, high-quality and information-intensive.

That is, unless we stick to the old concept of productivity. If we keep forgetting that all shirts are not the same shirt, we may miss out on a major growth area in the field. Not to mention paying too much for ill-fitting shirts.

> THE industrial revolution was the last revolution. The one going on now is making information cheap and accessible.

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

Secure information is accurate information

READER'S PLATFORM

BY ROBERT HARGROVE

Those of us who practice data security find ourselves in a bit of a dilemma these days. As companies concentrate on maximizing their return on investment, we find ourselves, like everybody else, somewhat expendable. With the concentration on profit, the old arguments for the existence of an area that does not act as a profit center may go increasingly unheard.

The first of these arguments is that data security, much like insurance, is just the price of doing business. This is the "You may hate us but you gotta have us" defense.

However, some organizations have discovered the hollowness of this argument as they find that cutbacks in other departments not only save money but actually increase efficiency. Thus, the old argument is challenged by a new one: "If we need you, prove it."

Close on the heels of the "You may hate us" defense is the argument that a good security program brings about peace of mind. True, but so does profit.

This argument also points out a fault in many security justifications in that they often rely more on emotions than quantification.

And let's not forget the phrase, "We have a security issue," which is to security practitioners what "Stop the presses!" is to a newspaper. The wheels of business must screech to a halt as corporate resources sniff out the security breach.

However, as the security function comes to be recognized as just another form of management rather than as a separate entity, the response to it becomes much the same as the response would be to "We have an accounting issue." That is: "Address it."

Merely tagging an issue as a security concern does not automatically elevate it to the top of the heap; indeed, there are few functions in MIS that do not in some way affect security. From broken locks (physical security) to abends (data integrity), the list seems endless.

Attempts to quantify the usefulness and necessity of security often take the form of eye-glazing risk-analysis reports — just another use of statistics, critics might contend, to justify the continued existence of a budding corporate behemoth. Even in industry publications the emphasis today is on connectivity, implying that the key to the future lies in ease of access, not lockouts.

However, before slipping in the resume diskette, there may be a few things security administrators can do to brighten their future. Perhaps we should take a nod from one of our more illustrious vendors and realize that no matter what else we do, we are also in the marketing business.

This realization entails more than the occasional security awareness film or the periodic announcement that "information is an asset" and then, after observing the corporate heads nodding in agreement, returning to our office from a job well done.

It is an ongoing process and, along with awareness, encompasses the need to convince management that security is not separate from the profit-making process but part of it; that a security program acts as a large editing tool, a corporate strainer, trapping those commissions of accident, malice and ignorance that can cost the organization time and money; that a security program exists not just to harbor data and impede access but to keep good people from doing foolish things, as humans are wont to do.

> THE emphasis today is on connectivity, implying that the key to the future lies in ease of access, not lockouts.

These mistakes can cost the organization dearly. Security practitioners, too, should realize that not every firm requires the security of a defense plant.

Calls for ever greater security, no matter how justified, smack of self-aggrandizement and turf-building. Security is a balancing act, attempting to find the right mesh between the Four P's: productivity, politics, performance and price.

The end result, then, for ongoing justification for security does not rest in such nebulous arguments as peace of mind, or "Think how expensive it would be without it," but with the rather more prosaic notion that sound business decisions can only be reached through the use of accurate information. Effective security is one of the best tools to achieve this accuracy. Security, far from being a luxury, is a vital partner to the organization in meeting the bottom line.

Hargrove is security and contingency planner within the data processing department at the University of Texas's Health Science Center at Houston.

"Our users need sophisticated on-line applications to sustain their edge in today's marketplace, and they want them yesterday. Structured design strategies and UFO's development system enable us to deliver these systems on time and on budget."

Laurence Caboon
Sobey's Stores
President, UFO-COBOL/XE
International User Group

REGISTER TODAY!

UFO-COBOL/XE
International User Group Meeting
October 25-28 • Orlando

"We have adopted UFO as our standard on-line application development tool. Using UFO in this manner has allowed Stroh to develop sophisticated applications quickly, because our developers can concentrate on solving business problems. UFO insulates development personnel from many of the technical aspects of CICS."

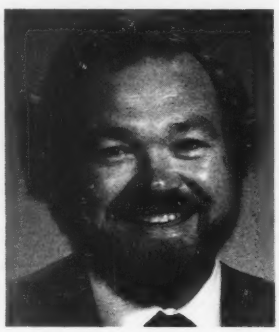
Mark Crist
The Stroh Brewery Company
Vice-President, UFO-COBOL/XE
International User Group

"Using UFO, we boosted productivity on the order of 80% relative to Command Level COBOL. We developed one system with UFO that employed a series of 33 integrated on-line screens in six months. We could never have developed this system under Command Level COBOL in that time period."

Priscilla Davis
National Standard
Co-Chairman, UFO-COBOL/XE
International User Group

"With very little on-line expertise on staff, we needed help fast, and we selected UFO. With UFO, two of us did in three years what we thought would take us six years with conventional on-line coding. And now, our applications are 100% on-line. All done with UFO."

Barbara Harris
University of Missouri
Treasurer, UFO-COBOL/XE
International User Group



"We have converted our central data entry to UFO applications, allowing the clients to do their own entry. Data is more current, with far less errors."

Roger Swartout
Blue Cross/Blue Shield of Indiana
Co-Chairman, UFO-COBOL/XE
International User Group

The on-line experts agree...UFO®

Their work is the most demanding of any in data processing: designing, developing, testing, and implementing comprehensive on-line applications that perform within the existing computer system's capacity...and also solve the business problems of their organizations.

They come from very different backgrounds: retailing, education, manufacturing, insurance. Yet, they have something in common, they set the standards for their organizations' fast, accurate on-line processing of information.

And, one of their standards is timely delivery of on-line applications—which gives them something else in common. Developing programs, testing them interactively, and seeing the effect of changes immediately, with the most advanced on-line applications development system available, UFO Productivity System from On-Line Software International.

UFO features efficient pre-programmed on-line functions, portability between DOS, MVS/XA, CICS, CMS, and TSO, an active data dictionary, and automatic file access. In short, a complete productivity environment for prototyping, testing, debugging, and implementing applications.

Ask any of the on-line experts at over 2,000 sites that are having productive experiences with UFO. Call an On-Line Software representative today, and ask for the names of users in your area who can share their UFO experiences with you. Or, to meet these on-line experts face-to-face, attend the next UFO-COBOL/XE International User Group meeting to be held October 25-28 at the Buena Vista Palace Hotel in Disney World, Orlando, Florida.

Call one of the officers, or Lisa Jones at On-Line Software, (609) 799-6300, ext. 6154 for registration information. It's an excellent meeting for sharing ideas and an easy way to learn more about increasing productivity with On-Line Software's advanced development tools.

If you want to develop efficient on-line applications as quickly as other on-line experts, try UFO. To arrange for a free 30-day trial, or to find out more about UFO Productivity System, or any of our other products, call or write On-Line Software International, Inc. Two Executive Drive, Fort Lee, New Jersey 07024. Service Bureau, OEM, and VAR programs are available.

800·642·0177

In Canada: 416·671·2272/In Europe: 44·1·631·3696

On-Line Software International
Authorities in IBM® Software

UFO Productivity System. The fast, flexible applications development system.

IBM is a registered trademark of International Business Machines.

SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Don't shoot messenger

Despite a vigorous attack, the benchmark conducted by discount broker Charles Schwab & Co. of DB2 is ably defended by Schwab spokesmen elsewhere on this page.

This does not mean that DB2 is limited in all production applications to 18 transactions per second, as it performed in the Schwab test. On the contrary, the Schwab application was a complex one involving 11 different data bases and a requirement that a control record be established for each call-in stock order.

It is possible that this single-record update acted as a choke point for DB2 because of its page-level locking mechanism, although opinion remains divided on that point.

What is clear is that in the heavy transaction processing environment at Schwab, a competing data base management system was better suited to the task than was DB2. Nothing more and nothing less. But some people are finding that hard to accept.

Sharon B. Weinberg, president of the Codd and Date Consulting Group, has publicly critiqued the benchmark, mistakenly calling Schwab's Stock Order Entry System an application designed for the competing DBMS, Applied Data

Continued on page 25

Schwab benchmark draws fire

Consultant attacks low results for DB2; Schwab officials stand by test

BY CHARLES BABCOCK
CW STAFF

SAN FRANCISCO — A Charles Schwab & Co. benchmark on IBM's DB2 and a competing data base management system was conducted unfairly and showed below-average transaction processing results for DB2, a prominent DB2 consultant has charged.

Schwab officials stood by the benchmark and said the critic, Sharon B. Weinberg, president of the Codd and Date Consulting Group, was in error on a key point of her critique.

The charges and countercharges are the latest in an ongoing debate about the transaction processing capabilities of DB2.

IBM has stated DB2 is capable of processing 47 transactions per second and has publicized the case of Provinsbanken in Denmark, which achieved 62 transactions per second in an automated teller machine appli-

Sharon B. Weinberg

cation. At a recent DB2 conference organized by Codd and Date in Toronto, Provinsbanken officials said they had achieved 100 transactions per second in tests.

At the same conference, Weinberg attacked the Schwab benchmark. Weinberg is IBM's former senior technical planner for DB2, and her firm is the consulting business offshoot of The Relational Institute in San Jose, Calif., founded by Edgar F. Codd and Chris J. Date.

The Schwab benchmark showed DB2 processing only 18 transactions per second of a complex Stock Order Entry System, compared with 36 for Datacom/DB, a DBMS from Applied Data Research, Inc. [CW, July 27].

Weinberg asserted that the Stock Order Entry application was written for Schwab's existing DBMS. "What was measured on DB2 was designed for Datacom. If it was not redesigned, it's clear it's not going to work with DB2," she asserted in a follow-up interview of her Toronto comments.

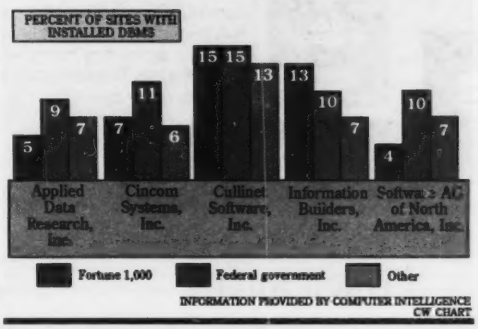
Schwab officials strongly disputed Weinberg's remarks. The Stock Order Entry application has been used for many years by the discount brokerage house and was originally written as a VSAM application, according to both James S. Rowe, senior vice-

Continued on page 30

Data View

Top five independent vendors by site type

Independents, ADR, Cincom and Software AG sell more DBMSs to the federal government than to Fortune 1,000 companies



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Tool opens VTAM doors

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Candle Corp. recently released a conferencing tool that would allow IBM MVS VTAM users to simultaneously view applications on separate terminals.

The first release of Candle Light (CL)/Conference 1000 is said to allow one user to originate a conference, which would display an application. An unlimited number of users can then

Continued on page 24

McClure: Integrate CASE tools

BY CHARLES BABCOCK
CW STAFF

BURLINGTON, Mass. — One way to evaluate the multitude of computer-aided software engineering (CASE) tools is to explore their level of integration, said Carma McClure, a lecturer and co-author of books on software development, at a recent CASE symposium here.

Speaking to 600 attendees at the Digital Consulting, Inc.-sponsored event, McClure said the latest CASE products begin to integrate several steps of the software development cycle. One requirement for integrating them is a central repository that can store not only code but also system specifications, designs and diagrams for reuse with future systems.

McClure also said the application of artificial intelligence techniques will aid software development by adding intelligence to tools in the 1990s.

"Suppose I want to change from one diagramming approach to another. I want an automatic capability to tell me whether I can do that.

"Right now, we have sophis-

Continued on page 26

Inside

- Data Design Associates gets kudos from its users. Page 24.
- Computer Consoles enhances Unix-based office automation system. Page 25.
- Scheduling package debuts from NBI. Page 31.

BIM Spotlight

Wouldn't it be nice to have a couple more terminals on your desk?

You could eliminate the inconvenience, lost productivity, and system overhead associated with logging off and on to different applications!

BIMWNDOW permits multiple terminal sessions to be active concurrently at the same physical 3270 CRT, under **DOS** or **OS** VTAM. The user may switch back and forth **instantly** between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different VTAM-connected partitions/regions. For example; one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a test CICS to test the application program being developed.

Call for full documentation or **free 30-day trial.**

Price: OS - $4800 or $200/mo., DOS - $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

BIM

BIM MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436

612-933-2885
Telex 297 893 (BIM UR)

Member Independent Computer Consultants Assn

Users: Data Design software comes out on top

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Despite its underdog role in the accounting software marketplace, Data Design Associates, Inc. last week received high marks from attendees at its eighth annual users conference here.

Customers of the Sunnyvale, Calif., vendor described the its mainframe financial software as "nearly bug-free" and praised its ease of use. One user, however, challenged a format change in a recent enhancement to the accounts payable package, saying it makes his historical information difficult to access.

Users said they chose Data Design products on those grounds and paid less attention to the company's "David-like role" in an industry dominated by such Goliaths as Computer Associates International, Inc. and Management Science America, Inc.

"Data Design was the smallest company we were looking at when we were shopping for a fixed-assets system, but the product seemed to sell itself," said Steve Chwalyk, manager of accounting operations at Sherwin-Williams Co. in Cleveland.

Not overly complex

Chwalyk said Data Design's Fixed Asset Accounting package features simple processing and easy-to-understand screens and documentation. Chwalyk characterized similar products from other companies as "overly complex."

Tammy Neils, a programmer at McKesson Corp., said she was able to teach herself how to use the Fixed Asset program relatively quickly, calling it a "stable performer."

Flexibility was a key issue for Ward Russell, manager of financial systems for American Cyanamid Co. in Clifton, N.J. He said American Cyanamid uses Data Design's Accounts Payable/Purchase Control software to process about 45,000 invoices per month.

Russell said he was attracted to the package because a user can easily modify its screens. "The screens are very flexible, and it does what you want it to do — it's a good system," he said.

While some players in the financial software marketplace have tried to diversity their application lines, Data Design continues to target a narrow range of accounting products. "We would rather focus on a few things, instead of diversifying and having our energies diffused — that could be a destructive approach for us," said David Lowry, Data Design's president and founder.

For the year ended March 31, the 14-year-old company had revenue of $16.1 million and approximately 700 customers nationwide.

Some not impressed

While most users expressed satisfaction with Data Design products, others were less impressed.

Joe Hepler, director of information systems for Vail Associates, Inc., the group that operates the Vail ski resort in Colorado, said a recently released enhancement to the Accounts Payable package has not pleased his company.

Hepler said programmers cannot convert accounts payable histories from the earlier release because the new version's formats are not compatible with its predecessor's. "It's given our accounts payable people some real headaches," Hepler said.

Service and support, while receiving praise from many, was also a sore point with others. Hepler noted that support often varies according to the product and the Data Design manager who is in charge.

"It varies, but what you usually get with complaints about the Accounts Payable product is, 'We'll turn that over to development and include it in the next release,' " Hepler said. "But who knows when the next release will be?"

Conference tools

CONTINUED FROM PAGE 23

view the application, according to Jeff Casher, a Candle product manager.

CL/Conference 1000 provides participants with read-only access, but a subsequent release will allow them to input data into a conference session, according to Casher.

The conference tool was designed to improve communications between end users and support staff by allowing a user to show support staff an application with which he is having problems rather than simply discussing it on the telephone.

It can also be used as a training aid, enabling support staff to display new product instructions to a large number of users at one time.

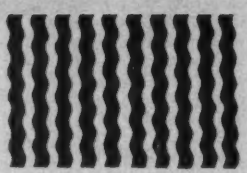
A conference session is set up by a user, who logs on and establishes a conference identification number for this session. He then provides the identification number to those users he would like to include in the session.

According to Casher, CL/Conference 1000 can accommodate at least 175 users. CL/Conference 1000 is currently available and carries a per-CPU license of $9,700.

VaporCASE

VaporCASE

The wishful promises of vendors who are trying to jump on the CASE bandwagon. They demonstrate part of the CASE solution, and hope you'll wait until they develop the rest of their system which they promise will be ready "any day now." Meanwhile, even if they could help you develop a brilliant applications strategy, you have no clear way to implement it.



Piece Parts

Some CASE suppliers offer a small piece or two of the puzzle. A front-end here. A back-end there. Integration? No problem! Just as soon as they can make Company A's front-end work with Company B's repository, and tie everything into Company C's code generators.

Projections

One way to evaluate a CASE system is to simply visit the installations where the product is up and running. Most CASE vendors will tell you where their product might be installed in the future...If you don't mind waiting.

CCI enhances Unix OA system

IRVINE, Calif. — Computer Consoles, Inc. (CCI) recently enhanced its Officepower Unix-based office automation system, providing increased functionality in word processing, spreadsheet applications, graphics generation and document and file conversion.

Officepower 4.0 runs on the complete line of CCI's Power 5 and Power 6 computers and is compatible with IBM Personal Computers. All CCI systems run under the vendor's CCI System V, a derivative of AT&T's Unix System V operating system.

The new release of Officepower features an integrated version of Access Technology, Inc.'s 20/20 spreadsheet with a business graphics package. Because 20/20 runs on micro, mini and mainframe computers, standardized modeling can be used, and models can be moved between PCs and Officepower processors, CCI spokesmen said.

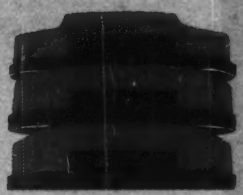
Other enhancements to Version 4.0 include proportional spacing with support for such laser printers as Hewlett-Packard Co.'s Laserjet series and Xerox Corp.'s 2700/3700 and 4045, automatic font conversion, a redundant file system for file protection and a function that automatically compiles citations in a legal document into an alphabetically sorted list. Officepower 4.0 also supports automatic crash recovery, CCI representatives said.

Word processing features added to Officepower 4.0 include a nonbreaking return that overrides automatic pagination, a 132-column display mode and a word-preview feature that displays a document as it will appear in print.

Available now, Officepower 4.0 software for a Power 6 system costs from $20,000 for 32 users to $40,000 for an unlimited number of users. A typical mid-range configuration, including a Power 622S superminicomputer with 48 ports and Officepower 4.0 software for up to 64 users, starts at $161,400. Officepower 4.0 maintains compatibility with the previous version, Officepower 3.04, the vendor said.

S PACBASE™

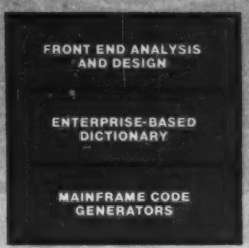
CASE Software



PACBASE is the completely proven, totally integrated, full life cycle CASE system that addresses the strategic concerns of MIS Directors. It speeds applications analysis and design, and eliminates the delays and the expense of applications maintenance... all helping to increase the MIS response for key business applications. No vague promises. No smoke. Just the reality of the proven CASE solution.

Architecture

PACBASE is the standard for the full life cycle CASE solution. It is a seamless integration of methodology independent analysis, prototyping and programming facilities with an active enterprise dictionary and automated generators. PACBASE produces complete COBOL programs, database descriptions, screen maps, integrated on-line help and documentation directly from design specifications. All portable across a wide variety of hardware, operating environments and DBMS', (including DB2)...IBM, Honeywell and UNISYS. All automatically maintainable at the specifications level. MIS Directors who understand the CASE problem recognize PACBASE as the total CASE solution.



Installations

There are over 500 PACBASE installations worldwide serviced and supported by a staff of over 1400 CGI professionals. Closer to home, there are nearly 100 installations in the U.S. that you can see today. So instead of listening to someone else's projections, visit one of our installations. Why wait any longer for the bits and pieces to come together. Call CGI Systems today for complete information about PACBASE... the complete CASE solution:

1-800-PAC-1866

PACBASE: Seeing is Believing

Show Me!

For a live PACBASE Executive Presentation that blows away all the vaporCASE, simply write PACBASE on your business card, send it to our Marketing Dept., and we'll contact you to arrange a date that's convenient for you.

cgi

CGI Systems, Inc.
One Blue Hill Plaza, P. O. Box 1645
Pearl River, NY 10965 (914) 735-5030

Don't shoot

CONTINUED FROM PAGE 23

Research, Inc.'s (ADR) Datacom/DB, which was written as a VSAM application.

Weinberg has even questioned the motives of the people conducting the benchmark. "The client might have been saying he wanted one thing [to install DB2], then arranged it so that it wouldn't happen." This is the technology era's equivalent of shooting the messenger because you don't like the message.

The Schwab MIS officials made no pretense of conducting a benchmark for all prospective DB2 users. They conducted it for themselves. "I'm just trying to get my job done," says James S. Rowe, senior vice-president.

Furthermore, the benchmark was conducted by a longstanding customer of IBM that prizes its relationship with that company. As purchasers of two IBM 3090 Model 400s and a 3083, Schwab has little desire to inflict injury on its mainframe supplier. On the contrary, the Schwab officials were highly circumspect in how they commented on IBM and the way the benchmark came about. This observer tends to believe ADR's account of the process: IBM was seeking to displace Datacom/DB with DB2 and sought the benchmark.

If Schwab has done a good job of answering questions about the benchmark, it remains to be seen whether its critic will do the same. For example, on what basis does Weinberg claim the application in the benchmark was designed for Datacom/DB?

Spokesmen for both ADR and Schwab say they haven't spoken with anyone from Codd and Date. Weinberg says she can't divulge her sources, but she made the chance observations that "I don't know what IBM's feeling is on the Schwab benchmark," and "There's not much coming out of IBM on this."

Plain-vanilla letter

On the contrary, it appears someone highly knowledgeable about DB2 has put out a two-page letter to the IBM sales force on how to respond to the benchmark. There was no signature on the letter, which was printed on plain paper.

This letter was not handed to a *Computerworld* staff member by an IBM employee, so its author remains unknown. But the letter states at the outset that it is being published "in response to numerous field inquiries."

Its criticisms of the Schwab benchmark at this point sound familiar.

The letter asserts that "this application has been running for years and has been tuned for optimum performance in the Datacom/DB production environment. The application was not tuned to consider DB2 design. . . . A converted application [to DB2] cannot be expected to achieve the same performance and throughput as an application that has been designed to take full advantage of the power and performance capabilities of DB2."

The letter closes with: "Our published DB2 Release 2 benchmark. . . achieved 47 transactions per second. . . . Release 3 showed about a 10% and 15% performance improvement over Release 2 with no thread reuse." It concludes with a reference to the 62 transactions per second throughput achieved by Provinsbanken in Denmark.

SOFTWARE NOTES

Broker workstation tools to debut

Innovative Software, Inc. in Lenexa, Kan., will provide software for a series of intelligent broker workstations to be produced by **ADP Financial Information Services, Inc.**, a subsidiary of Automatic Data Processing, Inc. The workstations will be designed to replace quote machines with systems that can provide client information, portfolio analysis and modeling options.

Hewlett-Packard Co. will offer a version of Relational Technology, Inc.'s **Ingres** relational data base management system on HP 9000 Series 300 workstations, HP 9000 Series 800 workstations and HP Vectra personal computers. Ingres is already available on the HP 9000 Model 840.

Software AG of North America, Inc. will comarket **Corporate Data Systems, Inc.'s** Bankwide deposit software system and Customer Information Facility for large and medium-size banks. Bankwide uses Software AG's Adabas and Natural.

Terradata Corp. has signed a

Continued on page 30

Case tools

FROM PAGE 23

ticated — but dumb — tools," she told the group. Many are stand-alone units, she said, frequently operating on the mainframe or the personal computer but not able to bridge the two and not offering a common user interface throughout the process.

More and more existing tools, however, offer analysis and error-checking capabilities missing a few years ago. McClure said that these tell the user whether his work is consistent with the structured methodology he is attempting to follow.

She offered a picture of an ideal development environment in which CASE tools would work together on microprocessor-based development workstations. The tools would share a common user interface, and the work accomplished at one step of the development process would set standards and specifications that could be adopted at the next level. In the ideal environment, a team of developers on workstations would jointly develop a system that could be transferred to a variety of mainframe environments or even across hardware environments.

Distant goal

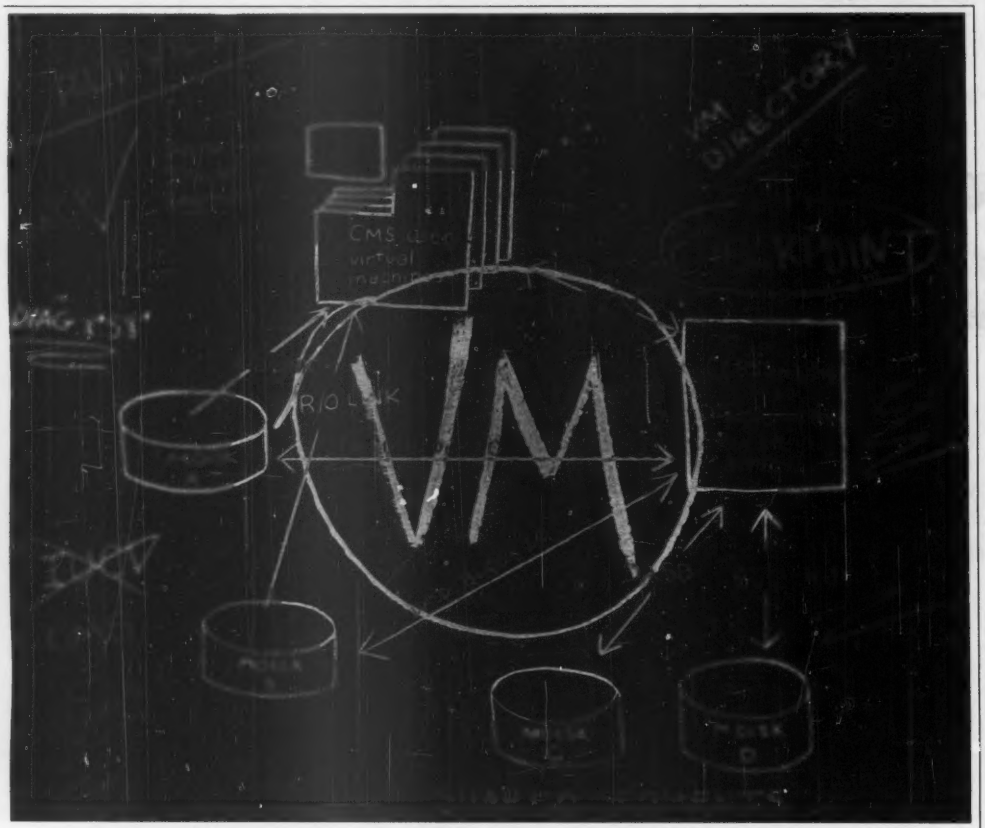
Such a high level of integration, however, is still a distant goal.

In the mid-1980s, vendors began to offer common user interfaces across several, but not all, of the steps in the development process. Their customers found that they could transfer data between a tool used at one level to one used at another. And in some cases, they are offering a central repository that stores all related information for a particular development phase, including diagrams and designs.

"Now, in the late 1980s, we want to link these techniques together. We want to be able to generate 80% to 90%, sometimes 100%, of the system from a diagram," McClure said. When analysis, specification and design can be captured in sophisticated diagrams, CASE holds out the prospect of feeding that diagram into an application generator and automatically creating the desired system.

To do so on a workstation requires an ability to bridge the mainframe and PC environments. The system developed on the workstation must be able to run on the mainframe, and "the repository will be a very important bridge to form that link," she said.

In addition, an intelligent tool would allow more "what-if" questions to be answered in the development process. One form might be path tracing, McClure explained. "Show me what happens between this source and this destination," she said.



Goal Systems Is Focused On VM

To get the most out of your VM system, you need to focus on the VM Data Center Management product line from Goal Systems. ACCESS/VM™, EXPLORE/VM™, ALERT/VM™, and FAQS/VM™ bring control of the VM operating system's resources into sharp focus.

These Goal Systems' products are easy to install, installation doesn't require a lot of system resources, and they are designed to work together. Goal Systems' expert 24-hour technical support is widely known as an industry benchmark, for excellence and responsiveness.

ELIMINATE THE MINIDISK SHARING PROBLEM

ACCESS/VM is currently the only true minidisk sharing facility, allowing multiple simultaneous read/write access to CMS minidisks. With ACCESS/VM, everyone from system programmers and software developers to end-users can accomplish their daily tasks easily and more efficiently, with no need for CMS modifications.

VM PERFORMANCE MONITORING

EXPLORE/VM is a uniquely flexible full batch and realtime performance monitor which can be customized to specific user needs. Color graphs and reports, historical and online analysis, and automatic procedure scheduling keep you informed and in control at all times.

SECURITY?

ALERT/VM makes VM security easy to administer. ALERT provides comprehensive, flexible security for all your VM resources. Because it is menu-driven, there are no programs to write. Just fill in the blanks to define the desired levels of security for each resource.

IMPROVE SYSTEM SUPERVISION

FAQS/VM provides real VM hardcopy, with the ability to scroll back and locate information in realtime. It also offers extensive console and spool file management, with console archiving, access verification, message highlighting, and notification of all significant system events.

ACCESS/VM, EXPLORE/VM, ALERT/VM, and FAQS/VM. The tools you need to keep your VM system in focus and on target. For a 30-day free trial or more information, call 800-848-4640, and get a clear image of what your VM system can really do!

Goal Systems

Software Solutions

Goal Systems International • 5455 N. High Street • Columbus, Ohio 43214-1193 • **800-848-4640**

It's a fast, powerful, self-configuring, self-diagnosing, multi-user supermicro that runs both and UNIX simultaneously.

Keep reading, it gets better.

If you're having difficulty cost-justifying minis for your distributed resource sharing, but your company has outgrown the personal computer network route...

If you're looking for Intel's industry-leading, 32-bit 80386 chip for unmatched speed and power; a CPU board housing 64Kb of cache memory (3.2 MIPs system performance rating), plus up to 1 Gbyte of disk storage; and up to 58 asynchronous lines to handle all your communications needs...

If you're thinking about a user-installable, self-configuring, self-diagnosing system that gets – and keeps – itself up and running with a minimum of maintenance and downtime and a maximum of performance and productivity...

If you're demanding standards, so that you can run both a SVID-compliant UNIX® V.3 and an MS-DOS® operating system – with a transparent interface that enables users to stay in one environment while quickly and easily accessing files, commands, and software in the other...

If you're interested in taking advantage of MULTIBUS II™, the most advanced system bus for connecting to most industry standard peripherals and TCP/IP over ETHERNET® for communicating in a multiple-system environment...

...then you should know more about the new PRIME EXL™ 316 supermicro. Starting at under $24,000, it defines the term "price/performance".

Call or write today for all the details.

As you'd expect from Prime Computer – the world-wide, Fortune 500 company that was voted as one of the top vendors in terms of customer support by Datapro – we've prepared a complete information kit for you, including a special report on, "The Advantages of the 80386 in an MS-DOS and UNIX Operating Environment." Send for it today by calling toll-free 1-800-343-2540 (in MA call 1-800-322-2450). Or fill in, detach and return this coupon.

The PRIME EXL 316 supermicro. Think of it as your MIS wish list.

It sounds like something we should know more about. Please send us your comprehensive information kit on the PRIME EXL 316 supermicro, including a special report on, "The Advantages of the 80386 in an MS-DOS and UNIX Operating Environment." No cost or obligation, of course.

Name _____ (Please Print)

Title _____

Company _____

Address _____

City, State, ZIP _____

Telephone _____

Send to:
Prime Computer, Inc.
Prime Park MS 15-60,
Natick, MA 01760.

Prime.

AD0270020

PRIME and the Prime logo are registered trademarks, and PRIME EXL is a trademark of Prime Computer, Inc., Natick, MA. UNIX is a registered trademark of AT&T Information Systems. Ethernet is a registered trademark of Xerox. MS-DOS is a registered trademark of Microsoft Corp. Multibus II is a trademark of Intel Corp.

How to install our office

How to expand our office

The Hewlett-Packard StarLAN office networking system works along the same lines as your existing phone system.

So where the phones go, your PCs can go.

It's a system with built-in flexibility, because the twisted pair wiring you need to plug into is often already in place.

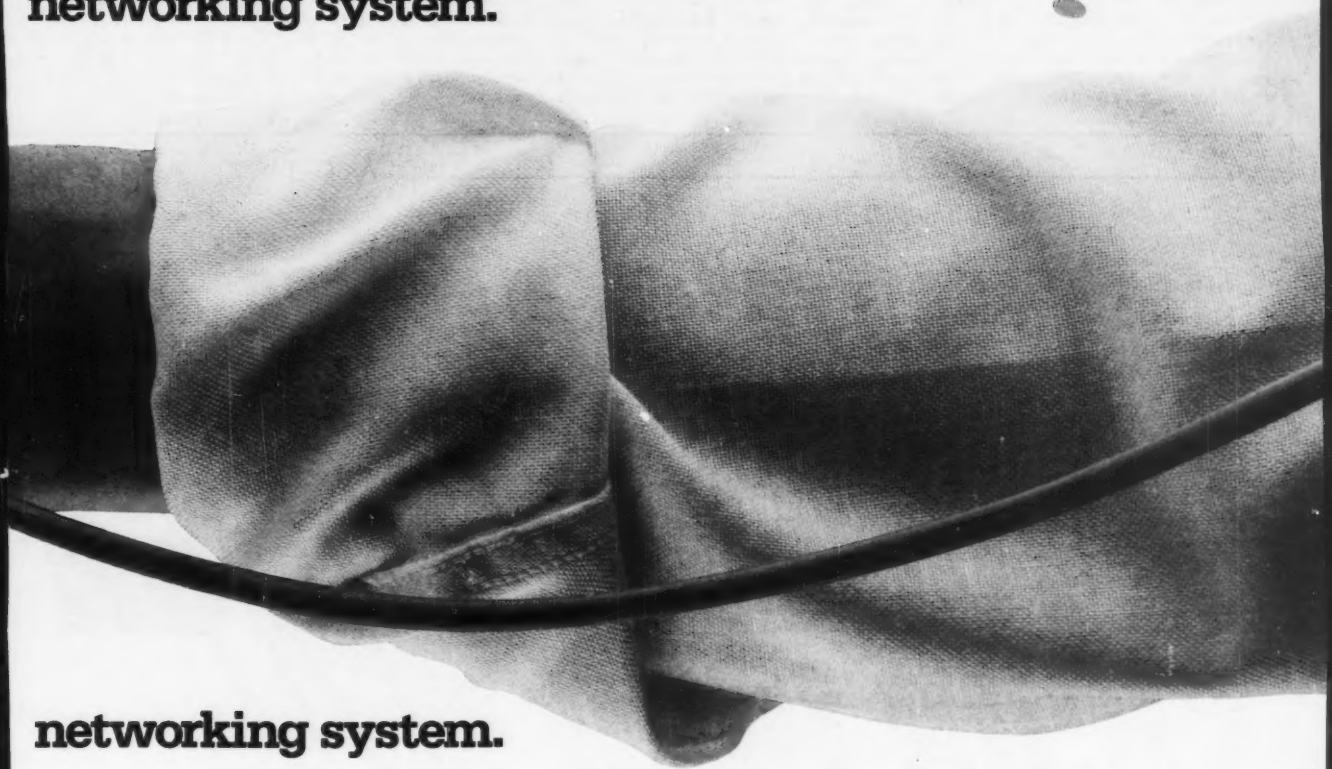
So it's an altogether more accommodating and cheaper idea than coaxial PC networks, such as Thinwire Ethernet.

And, of course, HP StarLAN is based on the IEEE 802.3 industry standard.

© Hewlett-Packard Co. 1987 1302722

we never stop asking "What if..."

networking system.



networking system.

As always, we asked a lot of "What if..." questions before we came up with HP StarLAN as part of Hewlett-Packard's total office systems solution.

To plug into our networking system, call 1 800 752-0900, Dept. 283B.

HEWLETT PACKARD

Schwab

FROM PAGE 23

president in charge of architecture, planning and control at Schwab, and officials at ADR.

William Inmon, a senior consultant with American Management Systems in Lakewood, Colo., and author of the manual, "Building Production Systems with DB2," said a VSAM application converted to Datacom/DB offered an opportunity for an equal test in the benchmark. "If it was originally a VSAM application, you should have an almost level playing field. You should not have a bias toward Datacom or DB2," he said.

"I don't know why the benchmark was done wrong," Weinberg said. The IBM field staff might have not set up DB2 properly, or Schwab "might have been saying he wanted one thing and then arranged it so that it wouldn't happen," she said.

"She's saying that it's not fair," Rowe said. "It still happens to be factual. The deck was not stacked against DB2."

In addressing 230 current and prospective DB2 users in Toronto, Weinberg said each order processed by the application had to go through one record, which acted as a choke point for DB2 but not for Datacom/DB.

She said ADR fine-tuned its system for the benchmark, while IBM was hampered by the fact that it could not make adjustments that would allow its DBMS to perform at capacity.

"IBM is confident DB2 delivers the performance customers require for a broad range of applications," said an IBM spokesman, declining further comment.

Rowe conceded that the Stock Order Entry System's use as a production system at Schwab meant that it had been maintained and tuned for use with Datacom/DB, but he objected strongly to the charge that IBM did not have a chance to tune the application to work with DB2. "That's bull. She's taking things out of context," he said of Weinberg's accusation.

Schwab gave IBM three months to prepare for the benchmark and installed a 10G-byte string of direct-access storage devices to provide ample disk space.

The IBM team members "were given the source code and told they could modify it any way they wanted, but the output had to be the same," Rowe recalled.

Rowe said the application requires each order to process one control record so that the firm has a sequential journal of the stock purchase orders. Rowe said DB2's mechanism, which locks records at the page level and maintains them until the transaction is completed, tended to freeze up the control number records and cause CICS to crash when contention for records built up.

"That kind of design is strangling for DB2," Weinberg said. Applications can be designed around the locking mechanism, she added.

"We didn't know it had this locking mechanism. We were surprised by it. There wasn't any way around it in our application," Rowe said.

Woodson Hobbs, executive vice-president of MIS at Schwab, said the benchmark was conducted because Schwab wanted to move away from its mixed Cullinet Software, Inc. IDMS/R and Datacom/DB environment. "IBM told us under our conditions, DB2 would give us the performance we needed," so Schwab agreed to conduct a benchmark, he said.

ADR Vice-President Stephen Gerrard said his firm did not seek the benchmark and was fearful that Schwab, by running it, was preparing to justify a switch to DB2. "IBM was getting heavily into the account. If they could have proved DB2 could do the same job, we'd be out and they'd be in," he said.

Hobbs said Schwab was prepared to accept a 10% to 15% performance disadvantage with DB2 but could not accept a 2-1 performance discrepancy.

Gerrard claimed ADR had a disadvantage in the benchmark. The latest production release of Datacom/DB is 7.4, but the Schwab application was geared to work with Release 7.2. Because of that, two features in Release 7.4 that would have improved the application's transaction throughput — data clustering and joined indexes — were not used, he said.

Recant

Weinberg modified her Toronto statement that the application's requirement to go through the single control record had penalized DB2 and favored Datacom/DB. She said she did not know whether Datacom was affected by it.

Inmon said the requirement should have affected both data base systems equally.

Schwab officials attributed Datacom/DB's stronger performance to its record-level rather than page-level locking, but Inmon said record-level locking alone would not account for the margin.

Broker tools

FROM PAGE 26

joint development and marketing agreement with **Metaphor Computer Systems** in Mountain View, Calif., to produce an icon-based graphical interface for Teradata's DBC/1012 relational data base machine.

Mainframe security experts Jack Bologna and Charles Varga of **Cossac Associates** in Plymouth, Mich., are offering a program that asks 218 true/false or multiple-choice questions about computer security policies and controls. The personal computer-based program, which will retail for $150, will provide a printed report on how adequate security is at a given installation.

Tata Engineering and Locomotive Co. in Pimpri, India, has sent out a letter to software consultants saying it would like to find "well-established software consultancy organizations with specific interest in manufacturing applications. . . . We believe we have got a bank of good skills that are in big demand in the U.S. and that can be easily marketed." The letter came from the office of J. S. Parihar, a division manager with the firm.

PARIS, APRIL

STARTING APRIL 25, BE TUNED TO THE SA SICOB 1988.

NEW PRODUCTS

Systems software

Western Data Systems has ported its integrated manufacturing, financial and contract-management software system for aerospace and defense contractors to the Digital Equipment Corp. VAX series of computers.

Compass Contract for the VAX runs under VMS and uses the DEC Remote Management System file-management system.

The product includes an optional integrated journaling facility.

Written in ANSI-standard Cobol 74, the system offers integrated security and a single command to access the application menu.

It is transparent to network and cluster configurations. IBM JCL batch reports can be generated through the on-line dialogue, the vendor said.

Compass Contract software costs from $100,000 running on a Microvax to $400,000 for the VAX 8800.

Western Data Systems, 22120 Clarendon St., Woodland Hills, Calif. 91367.

CICS Manager Release 2.0.0, an enhanced version of the CICS performance-management software product that features separate address-space operation, has recently been announced by **Boole & Babbage, Inc.**

Available for the IBM MVS/XA and MVS/370 environments, the new release allows users to remotely manage multiple CICS regions from a single terminal session.

The software provides users with a global view of CICS, the vendor said.

The release is also said to be ISPF-compatible. According to the vendor, it supports standard ISPF functions including split screen, general-purpose command line and the ability to jump directly to and from unrelated functions.

CICS Manager Release 2.0.0 is priced from $19,000.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Tablesonline/CICS, which is an interactive menu-driven facility for the control of CICS applications and the management of tables, has been announced by **Data Kinetics.**

Tablesonline/CICS operates in conjunction with Aratek International, Inc.'s Tablebase, an automated table management product for IBM mainframe systems.

According to the vendor, Tablesonline/CICS gives Tablebase users working in CICS a centralized, interactive data entry and validation system for creating, testing and maintaining tables on-line.

Users are said to be able to share the same table simultaneously for reading and updating.

Tablesonline/CICS works in DOS, MVS and MVS/XA environments, the vendor said.

The product is priced at $15,000.

Data Kinetics, 97 Norman St., Ottawa, Ontario, Canada K1S 3K5

Applications packages

Sales History, a sales and analysis package written in Cobol for Digital Equipment Corp. VAX computers, has been announced by **MCBA, Inc.**

The package is the 12th module in MCBA's VAX Cobol product line.

It automatically obtains data when invoices are printed and optionally allows manual entry of data.

Features include sales analysis, sales comparison and sales detail reports.

Users can specify report parameters to pinpoint the desired information.

According to the vendor, reports may be processed in the background.

Prices range from $2,000 to $4,000.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

A calendaring and scheduling software package called **Time Management** has been announced by **NBI, Inc.**

The program, designed to run on the vendor's 500 Series of minicomputers, is said to be accessible to users of NBI word processing, personal computing and electronic publishing workstations.

It consists of two integrated packages: one for calendaring and one for scheduling.

Calendaring features include the maintenance of calendars using graphic and text representations, automatic archiving of past events and printing of calendars and to-do lists, according to the vendor.

Scheduling functions include time searches designed to identify available time slots and provide user notification via electronic mail.

Time Management costs $2,000.

NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

Software that was designed to automate patent docketing on Wang Laboratories, Inc. VS computers has been announced by **Sotas, Inc.**

Patent Manager is said to give users the ability to generate memos on action events as well as perform correspondence to the U.S. Patent and Trademark Office without human intervention.

The software also tracks disclosure status and specific dates so that patents do not lapse because of inaction on the part of the patent holder, according to the vendor.

Other features include the ability to generate checks in-house; the ability to create, view and print reports; on-line data entry validation; and the ability to store artwork along with text and litigation.

The Patent Manager is priced from $18,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

25-30, 1988

TELECOMS WILL ALL ME FREQUENCY

In 1988, télécommunications will be an even greater feature at the SICOB Show!
Including a series of Telecom Conferences at the "Parc International d'Expositions Paris-Nord" and the central topic of the "Convention Informatique" congress at Palais des Congrès: TELECOM AND CORPORATE NETWORKS. SICOB will also be highlighting all the latest innovations in Office Organisation and Automation, Reproduction, Duplication and Data Processing.
SICOB 1988 where international exhibitors and visitors will be tuned in on the same wavelengh.

SICOB
THE INTERNATIONAL BUSINESS SHOW

SICOB FRANCE 4, Place de Valois-75001 Paris Tel: 42 61 52 42 Telex: 212597F
PROMOSALONS
INTERNATIONAL TRADE EXHIBITIONS IN FRANCE, INC
8 West 40th Street - Suite 1505 - New York, N.Y. 10018
Tel.: (1212) 869.1720 - Telex: 427 563 FRSHOWS

The Gandalf Hybrid™

Productivity through systems connectivity.

Getting improbable partners to work together for maximum productivity is what we do best.

It's what you'd expect from a company that spends over 12% of its revenues on research and development.

The result: The Gandalf Hybrid. A customized information processing and delivery system combining the best features of all your computing resources.

No matter how uncongenial your processing partners may appear, a Gandalf Hybrid makes them perform together as if they were born that way.

Which is why Gandalf networking systems are so efficient and so reliable.

gandalf

The Gandalf Hybrid, one of a series.

© 1987 Gandalf Technologies, Inc.

An enhanced version of the **Tolas** application software system for distribution and financial management has been announced by **Transcomm Data Systems, Inc.**

Release 6.3 is said to be compatible with Digital Equipment Corp. VAX minicomputers running DEC's VMS operating system. It utilizes the Common Data Dictionary as a central storage facility for data definitions.

Features include functions for kit processing, invoice consolidation and future order processing. It also allows for the calculation of value-added taxes.

Modules available include order entry, inventory and purchase order management, sales analysis, accounts payable and receivable and the Tolas Information Reporting System.

License fees for Version 6.3 modules range from $3,500 to $43,000.

Transcomm, 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

Languages

An enhanced version of APL designed specifically for Digital Equipment Corp. VAX computers running the VMS operating system has been announced by **STSC, Inc.**

In addition to providing standard APL features, the **APL Plus System** includes a direct interface between APL and other programming languages such as C and Fortran. Users can also execute VMS DCL commands from the APL environment. Other enhanced features include a multiuser, component-based file system, built-in error-handling capabilities; business report formatting capabilities and a library of prewritten utility software.

Prices for the APL Plus System range from $5,000 to $30,000.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

A Modula-2 language system for the Masscomp 5000 family of technical systems has been introduced by **Ana-Systems.**

Modula-2 is a programming language derived from Pascal. With Ana-Systems' **Modula-2/68**, program modules can be compiled separately. An executable process can then be built by linking with other previously compiled modules or by linking with library procedures written in C. This allows Modula-2 modules to make use of previously written and debugged subroutine libraries in other languages.

For applications based on Motorola, Inc.'s MC68000 processors, the linked Modula-2 programs can be written in Motorola S-record format and then downloaded to standard development systems.

Modula-2/68 costs $1,200.

Ana-Systems, P.O. Box 4759, 697 Saturn Court, Foster City, Calif. 94404.

Utilities

An **Export Facility** has been announced by **Technology Information Products Corp.** (TIP) for use with its Release 1.1 of TIP Plan and TIP Define information engineering software.

The facility is said to allow users to automatically select and transfer textual and graphical information from the TIP data base to TIP Relate, TIP Repository and other system products such as IBM's DB2, independent data dictionaries and other data base management systems.

TIP Plan and TIP Define are components of TIP's integrated modular technology software for the information system planning and development process.

TIP products range in price from $20,000 to $60,000. The Export Facility, an optional feature, costs $5,000.

Technology Information Products, 12 New England Executive Park, Burlington, Mass. 01803.

An on-line disk defragmenter for the Digital Equipment Corp. Vaxstation 2000 has been announced by **Executive Software, Inc.**

Diskeeper is said to allow data to be read from the disk while grouping free space at the front of the disk. It can run on-line as a detached process while users are accessing the system.

Diskeeper for the Vaxstation 2000 costs $375.

Executive Software, Suite F, 3131 Foothill Blvd., La Crescenta, Calif. 91214.

An interface designed to link Relational Technology, Inc.'s Ingres relational data base system and SAS Institute, Inc.'s SAS System has been announced by **Software Interfaces, Inc.**

The interface, called **Istat**, enables users to combine the two programs for reporting, graphics and statistical analysis. Data can be managed in the Ingres data base system and accessed as needed for update, reports and analysis using the SAS System.

According to the vendor, the interface can be used with Relational Technology's Ingres/Star distributed data base product to enable SAS users to simultaneously access information from multiple computers.

Currently available on Digital Equipment Corp. VAX/VMS systems, the interface is priced between $2,500 and $7,500.

Software Interfaces, Suite 355, 13831 Northwest Freeway, Houston, Texas 77040.

Turbodisk Plus, a new version of the software virtual-memory device, has been announced by **EEC Systems, Inc.**

Designed for use on Digital Equipment Corp.'s Microvax II running VMS or Mi-

Continued on page 34

CICS
will never be the same.

ENVISION A single image view of all your applications where you have no need to use APPLIDs, multiple sign-ons, or transaction codes, and you can move effortlessly and instantly from one CICS application to another without ending the first. You can even access IMS or PROFS with the press of a key.

INNOVATE New technology that brings you: A Dialog Manager, Parallel Applications, Multiple Windows, Automatic Logon, Single Sign-on, Enhanced Security, Dramatically Reduced Response Time, Bulletin Boards, Dynamic Menus and Sub-menus, Broadcast to All Terminals (signed-on or not), Network Security Protection, Terminal Switching, Automatic Recovery of Terminal or Network Errors without losing your Work-in-Progress, Automatic Terminal Lock, Disconnect and Reconnect from any Terminal, LU 6.2 Session Support, Flexible Customization, Superior 3270 Datastream Compression, Support for any Application, and View of Other User's Screens.

CREATE PIE/CICS,™ Productivity Integrated Environment.

TSC
Technologic Software Concepts, Inc.
16842 Von Karman, Irvine, CA 92714 (714) 863-7080
PIE/TSO,™ PIE/VM,™ and PIE/NET™ are other PIE products.

☐ Send me more information on PIE/CICS.™ A50

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
CPU _____ Op/Sys _____
Technologic Software Concepts, Inc., 16842 Von Karman, Bldg 450, Irvine, CA 92714

Continued from page 33

croVMS and PDP-11 systems using any RSX, MicroRSX or RSX11M+-based operating system, Turbodisk Plus allows current PMI memory to coexist with up to 60M bytes of QEDI memory manufactured by Clearpoint, Inc. Facilities include automatic backup, cluster-sharable disks and a file monitoring system.

Software licenses cost $1,000 for RSX-based PDP-11 systems and $2,500 for Microvax systems.

EEC Systems, 327/E Boston Post Road, Sudbury, Mass. 01776.

A CICS tuning product for IBM DOS/VSE environments has been announced by **Data Write Co.**

The product, called **Snap**, is a group of ICS assembler programs designed to display information about the operation of a CICS/VS system in an on-line real-time mode. Snap is said to provide the ability to present a large amount of data at the user's request without waiting for CICS shutdown statistics.

Snap runs as a pseudoconversational task and is priced at $3,600.

Data Write, P.O. Box 433, Benton, Ariz. 72015.

RFU/36, a software tool for the IBM System/36 said to convert source statements from IBM's Data File Utility (DFU) into RPG program source code for list operations, has been announced by **Kisco Information Systems.**

RFU/36 translates any DFU source specification into a usable RPG II report program. According to the vendor, all features of DFU are supported, including related-master file processing. It also creates an OCL procedure and sort specifications as necessary.

RFU/36 is priced at $250.

Kisco, Suite 6-G, 120 Beverly St., Mt. Kisco, N.Y. 10549.

Release 2.0 of the **Deskworks/34-36** spreadsheet processing software program for the IBM System/36 and 38 has been announced by **System Support Products, Inc.**

Features include a file-to-spreadsheet download procedure; an exit-to-user procedure; limited library access; additional cell formats; support for string values; allowance for absolute and mixed-cell references; and enhancements to the retrieve-data-from-external-cell and -from-disk-file functions.

New commands include the change column-width command; the replicate cells and paste section commands; the insert and delete columns and rows commands; and the print spreadsheet command.

Deskworks/34-36 Release 2.0 is priced at $395.

System Support, 7620 Arlen St., Annandale, Va. 22003.

Datalock, software that is said to interactively encrypt data on Digital Equipment Corp. VAX computers to the U.S. Bureau of Standards' Data Encryption Standard (DES), has been introduced by **Interactive Technology, Inc.**

Developed by JPY Associates Ltd. in Surrey, England, Datalock reportedly provides data encryption and decryption for data storage and retrievals to and from any VAX disk.

It implements to a DES encryption algorithm by means of a pseudo-device-driver compatible with standard VMS, the vendor said.

Encryption and decryption is transparent to the user application on Deadlock due to the fact that the data is stored on the disk in an encoded form, according to the vendor.

Datalock is priced from $2,995 to $4,995 per CPU.

Interactive Technology, 460 Park Plaza W., 10700 S.W. Beaverton-Hillsdale Highway, Beaverton, Ore. 97005.

Development tools

BBN Advanced Computers, Inc. has announced that its Butterfly parallel processors now support Quantitative Technology Corp.'s **Math Advantage** scientific and engineering subroutine library.

Math Advantage provides building blocks that can be embedded in applications, including simulations of chemical processes, very large-scale integration circuit simulation, image understanding for industrial inspection and sonar signal processing.

Math Advantage, which can be programmed in C and Fortran, provides algorithms such as eigensystems, one- and two-dimensional Fast Fourier Transforms, 2-D convolutions and complex matrix operations.

Math Advantage for the Butterfly costs $5,000 for the object code and $7,500 for the source code.

BBN, 10 Fawcett St., Cambridge, Mass. 02238.

Caseware, Inc. has ported its computer-aided software engineering product, **Amplify Control**, to Sun Microsystems, Inc.'s Sun-4/200 Series workstations.

Amplify Control is a Unix-based software development environment said to automate software development tasks. Each task is accessed through a uniform graphics interface. Features include a version control facility for managing software releases, a structure diagramer, automatic generation of Unix makefiles, concurrency control and the ability to bring existing programs into the Amplify environment.

Amplify Control is licensed at a cost of $3,500 per CPU.

Caseware, 1590 Corporate Drive, Costa Mesa, Calif. 92626.

BIG BANG WITHOUT BIG IRON!

SSI Software Builds Bigger CPUs by Linking VM Systems

With VM/CMS's Single System Image (SSI) software, you get a bigger bang from your multiple VM processors. An SSI complex offers the reliability and availability of multiple-processor configurations together with the convenience of a single-processor. That gives you reduced hardware costs, unlimited system growth, increased availability, separation of performance-critical workloads, and improved system performance.

Alternative to Hardware Upgrade

SSI allows you to postpone or eliminate the need for an upgrade to a bigger mainframe. You can get more computing power by connecting your existing CPUs or linking several smaller VM systems, rather than buying bigger iron. In many cases, you can save $500,000 or more by using SSI and multiple processors to *build* a larger machine.

Manage Information Center users more effectively

If you have a large number of PROFS or other info-center users that are outgrowing a single processor, SSI allows you to separate them onto multiple processors without inconvenience. The users can still communicate as if they are all on one processor.

Eliminate duplicate software licenses, including SNA

SSI's dynamic switching facilities save you the cost of having to license software on each processor since it can move virtual machines to the processors where licenses are held. In a two-processor SNA environment, eliminating the duplicate SNA-related software pays for SSI. With three or more processors, the savings are even more dramatic.

SSI Far Surpasses That "Other Company's" Offering

Unlike IBM's recently-released ISF, SSI has been successfully installed and used in many sites worldwide since 1980. Unlike ISF, SSI does not require HPO 4.2 and PVM. SSI supports *all* processors in *all* groups. And an SSI complex supports up to 33 processors. It is priced by complex, not by CPU, and is installed by the VM experts of VM/CMS.

Contact Charles Aronovici at (617) 288-4434 to learn more about SSI and to hear how SSI users are successfully leveraging their VM system investments today.

Single System Image (SSI)
from
VM/CMS Unlimited, Inc.
161 Granite Avenue, Boston, MA 02124
617 288 4434 800 443 4317

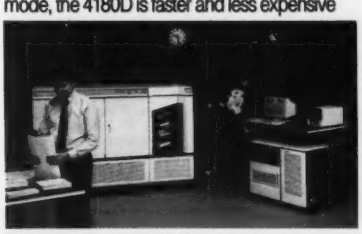
VM/CMS
Expanding the vision of VM.

Our duplex printing system is so fast and flexible, only one kind of company doesn't need it:

The kind that already has it.

Whether it's invoices, business letters, policies, newsletters, manuals, reports, even admission tickets, the 4180D duplex printing system can handle virtually all your high volume graphic and data printing requirements.

At 180 impressions per minute in duplex mode, the 4180D is faster and less expensive than other high volume printer products.



And the 4180D has unique features such as Dynamic Forms Selection for printing different forms front and back, or changing formats dynamically page to page without affecting performance.

You'll also get perfect registration on printed forms, in-line perforating and punching, printing of up to 22 document sizes in half-inch increments and unsurpassed output handling with stacking and collecting of output in five selectable formats in up to 12 output trays.

The 4180D comes with full electronic forms and fonts design capability. For those who require more advanced graphics and image printing, an optional Image Processor may be added. This tremendous flexibility of the 4180D is the result of its powerful DPS6/70 miniprocessor and GCOS MOD 400 operating system software.

Unlike competitive products, the 4180D delivers full job automation, job accounting, on-line host connections to IBM and Honeywell mainframes, an array of communications options, and off-line tape input from a large variety of host products.

For more information, or to schedule a demonstration, call: Arne Johnson at (617) 431-3120 or write:

Honeywell Bull, Page Processing Operations, 65 Walnut Street, Wellesley, MA 02181.

Honeywell Bull

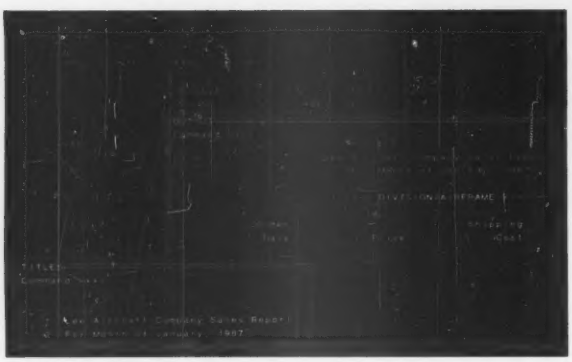
Customers are more important than computers.

The SAS® System

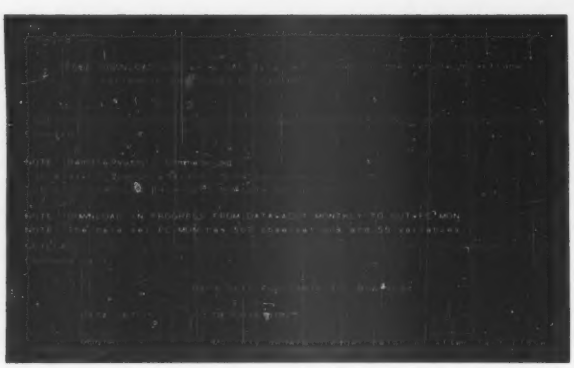
Power Behind Every Window.

If you're "window shopping" for software that's both powerful and easy to use, take a look at the SAS® System for Personal Computers. It's got everything you're looking for...and more.

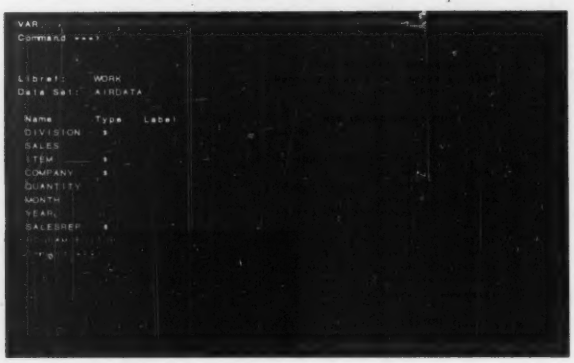
1 **Ease of use.** The SAS System has ready-to-use procedures for every kind of analysis and report—from simple to advanced, preformatted to customized. There's even a built-in menu system to guide you through the procedures, and on-line help is always available. Special windows let you define titles and footnotes for reports, check the characteristics of your data, change function key definitions, and keep notes.



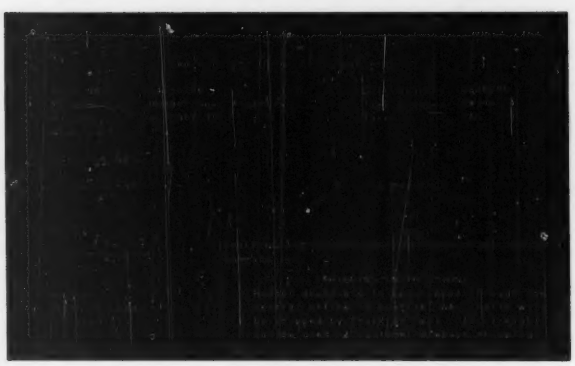
2 **Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®



3 **Integration.** The SAS System runs on mainframes, minicomputers, and personal computers. The language and the syntax are the same. The full-screen text editor is the same. You only have to learn one software system no matter what hardware your company has installed.



4 **Expandability.** As your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.



Call or write us today.

SAS Institute Inc.
Box 8000 ☐ SAS Circle
Cary, NC 27511-8000
Phone (919) 467-8000 ☐ Fax (919) 469-3737

The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. dBASEII and dBASEIII are registered trademarks of Ashton-Tate. Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. Copyright © 1986 by SAS Institute Inc. Printed in the USA.

MICROCOMPUTING

MICRO BITS

Douglas Barney

Hurry up and wait

The microcomputer software business has been more than a bit boring lately.

Sure, some exciting things will happen next year when Microsoft's OS/2 ushers in a new era in microcomputing. By then, software will do many things at once, use gobs of memory like a mainframe and look good while sorting or recalculating.

But as far as most users are concerned, that stuff should have arrived by now, especially given that the Intel 80286-based IBM Personal Computer AT has been out for more than three years.

And like OS/2, Microsoft Windows, an interface that mimics the Apple Macintosh, was supposed to spawn a host of exciting applications.

While some companies, such as Micrografx, Inc., have introduced bold Windows products, the bulk of applications remain in the staid world of character mode.

Tired of waiting

So where is the new and exciting software that a user can buy today for an IBM PC or compat-

Continued on page 41

Mac's shifting sands

Compatibility problems continue to dog updates

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s Multifinder, the operating system soon to be shipped with all Macintosh personal computers, could render some previously issued software packages incompatible.

If history is any indication, however, industry observers said Apple — and its third-party developers — will move quickly to resolve the incompatibility issues.

"It's not unusual," said Tim Bajarin, industry analyst for Creative Strategies, Inc. "You'll get certain software incompatibility problems with first-time-out software."

The introduction of Macintosh II created compatibility problems with the new system and previously issued Mac software. Even Apple-developed software programs like Macwrite and Macterminal were incompatible with the new systems, a problem that was later corrected.

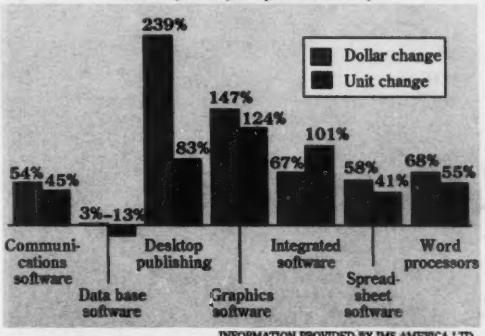
Apple downplays compatibility problems revolving around the Mac II. "There have been a few packages that don't take advantage of all the new features the Mac II has to offer, like the bigger screen," said John Zeis-

Continued on page 40

Data View

Retail shelves

Changes in store purchases of microcomputer software in first six months of 1987 from year-earlier half



INFORMATION PROVIDED BY IMS AMERICA LTD.
CW CHART

Belove: Lay groundwork before OS/2 ship sails in

As corporate vice-president of research and development at Lotus Development Corp., Edward J. Belove oversees product development.

But the Harvard University graduate, who began his career by working for IBM as a teenager, does more than the typical R&D chief.

In addition to technical duties, Belove has responsibility for business development and was instrumental in negotiating Lotus's joint development agreement with IBM, announced earlier this year.

Belove recently spoke with *Computerworld* Senior Editor Douglas Barney about users' transition to new microcomputer technology, such as IBM's Personal System/2 and Microsoft Corp.'s MS OS/2 operating system. He also revealed a glimpse of Lotus's future strategy.

What can corporations do to prepare for the new generation?

At this point, it is primarily educational. We are in a period that is confusing for users — and for us, for that matter, because we are experiencing an evolutionary change. In a way, a revolutionary change is easier because there is a nice, clean dividing line that everybody crosses over at some point.

Talk to your vendors to see what their plans are, and make sure they are consistent with the direction of your own computing.

Why should MIS be considering the change to a new operating system and applications?

It will relax some of the restrictions on current applications in terms of space and concurrent functionality.

Edward J. Belove

Before, you had to take a piece out of memory and replace it with something else to move from function A to function B. All of a sudden, you can have them both co-resident. Your perceived performance goes up, and the convenience level increases.

Continued on page 41

Inside

- Digital audio tape gains interest as storage alternative. Page 38.
- NEC announces hard drive version of IBM PC-compatible laptop. Page 40.
- Ideassociates rolls out 5251 emulation board. Page 47.

IMS DB/DC on a PC? They said it couldn't be done. It's now available as an option for VS COBOL Workbench.

Create new IMS applications or maintain your old ones with the new IMS option for VS COBOL Workbench* on your IBM PC/AT™ or PS/2™ and get all these benefits:

- Eliminate turn-around delays of IMS, DBD, PSB and MFS generations
- Instant response time
- Minimize TSO/BTS job charges
- Prototype IMS applications easily
- Minimize IMS control region abends
- Put mainframe resources on your desktop
- Test IMS applications in a structured, responsive environment
- Compile, link, and test programs in minutes
- Use better and more responsive test facilities

Look at these features:

- Full database call support
- GSAM
- CHECKPOINT/RESTART
- Secondary Indices
- Complete SSA processing
- All SSA Command Codes
- Adherence to DB positioning rules
- Conversational and non-conversational trancodes
- Message switching
- Exact PCB feedback (Status Code, Key feedback and length, Segment Name and Level, etc.)
- MFS support for 3278 Models 2, 3 and 4
- /FOR and /EXIT commands
- Input/Output message queuing
- Dynamic cursor positioning
- Dynamic attribute modification
- Process limit count
- PCB status reporting
- DB/DC call tracing
- DB utilities

For Huge IMS Programs

Our XM™ Memory Extender for PC-DOS and 32 bit compiler architecture make it possible to handle them on 80286/386 machines.

VS COBOL Workbench is a unique system of software tools for maintaining, creating, testing and running advanced COBOL programs on PCs. The IMS option greatly enhances its usability for mainframe programmers.

For the most efficient development of either your PC or mainframe programs, call us now.

1-800-VS-COBOL

U.S.: 2465 E. Bayshore Road
Palo Alto, CA 94303
(415)856-4161

U.K.: 26 West Street
Newbury, Berkshire RG13 1JT
(0635)32646

MICRO FOCUS

A Better Way of Programming™

"We found and corrected errors in minutes where we used to take days,"
Report from Beta Site User

Micro Focus, A Better Way of Programming, XM and ANIMATOR are trademarks of Micro Focus Limited. VS COBOL Workbench is a registered trademark of Micro Focus Limited. PC/AT, PS/2 and OS/2 are trademarks of International Business Machines Corporation.

Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest as a high-capacity data storage alternative.

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-in. tape cartridge systems with 150M-byte capacities and storage rates of 6M to 7M byte/min.

When production volumes increase, the cost of DDAT systems is expected to drop below $1,000 at the OEM level and be competitive with the quarter-in. tape products.

DDAT is expected to be a competent archival and data and computer graphics storage backup device for a range of computer systems, particularly among high-end microcomputers.

But there are problems. The primary concern recently has been one of standards. There is still no single accepted method for the DDAT player to record data onto the tape, and many are worried that the promising new media's chances of widespread acceptance are impossible without standardization.

"It's an issue that the industry needs to address and make happen," said Lee H. Elizer, president of Peripheral Strategies, Inc., a Santa Barbara, Calif.-based data storage consulting and research firm.

"If vendors all go off and develop products independently of each other, DDAT will end up like WORM," he added, referring to write-once read-many optical-disk technology, the acceptance of which has suffered from a lack of industry standards.

Elizer is working to develop a dialogue between potential DDAT vendors and OEM customers regarding format and interface standards. He said he has scheduled a meeting Nov. 4 at Fall/Comdex '87 in Las Vegas to discuss the organization of a DDAT standards body.

East vs. West

Determining DDAT standards could well turn out to be yet another East vs. West conflict, however.

DDAT technology closely mirrors that of DAT, with the exception of the computer interface and possibly the error-correcting code and the read/write head, which can vary depending on the manufacturer. To be successful in the U.S. market, DDAT must piggyback off the acceptance of DAT in the consumer market and take advantage of existing DAT components, many of which are manufactured in Japan.

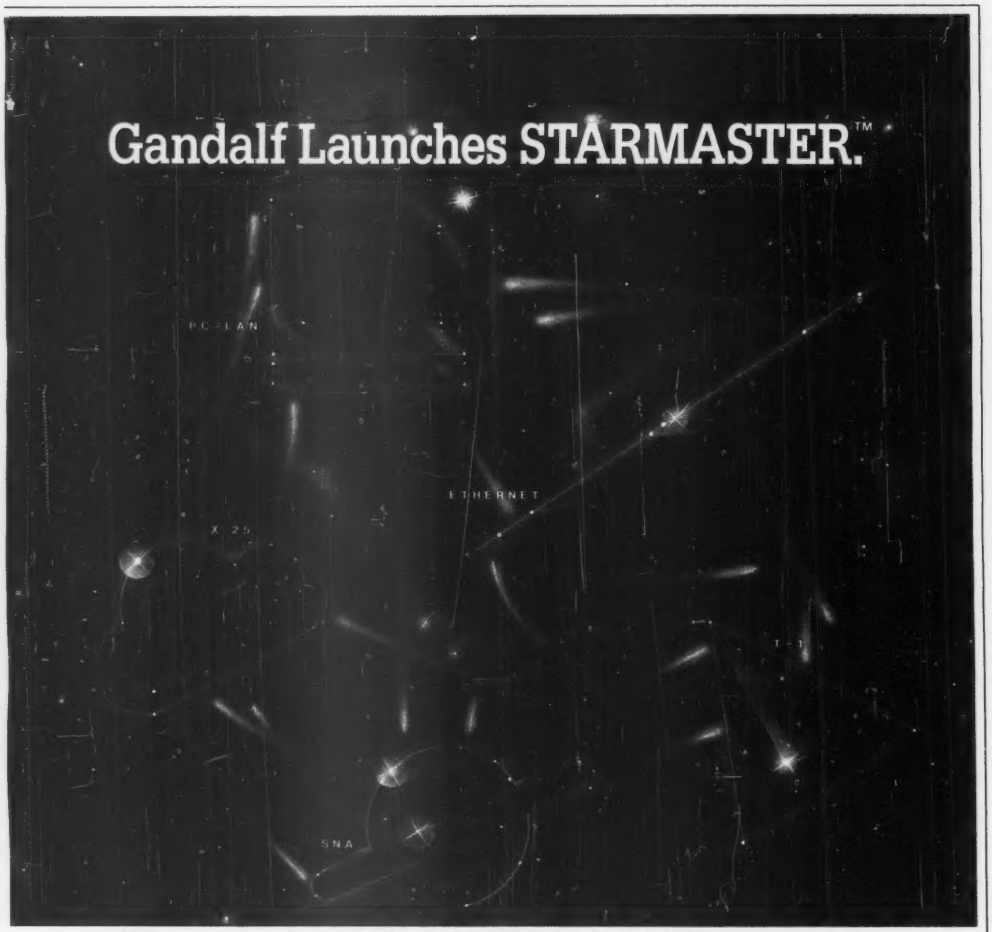
"Japan will have more leverage in setting the DDAT standard in the U.S.," predicted Bert Vermeulen, marketing program manager for Hewlett-Packard Co.'s storage division in Greeley, Colo. "It might be too late for American companies to agree on standards, because clearly the Japanese are a much bigger factor in the standard-setting process than they ever were before."

HP, Sony model

HP and Sony Corp. announced in August a joint agreement to develop DDAT players using Sony designs and HP controllers. The HP-Sony model will reportedly have a storage capacity of 1.2G bytes.

Meanwhile, Japan has a foothold on the market, in which DAT is well accepted by consumers. Hitachi Ltd. in Japan is preparing DDAT technology for the American marketplace and has displayed a prototype.

It is not known if the HP-Sony device, which will be available in late 1988, will be completely compatible with Hitachi's, however. Vermeulen declined to discuss any talks between HP, Sony and Hitachi, but added, "It would



The new, hybrid virtual connectivity system that helps you make these connections...and more.

Welcome aboard STARMASTER. Destination: the future of network communications. Estimated time of arrival: today.

Gandalf proudly introduces STARMASTER...the advanced synchronous, modular network system that integrates the technologies, standards, applications and products of various vendors, independent of intervening protocols or transport facilities.

STARMASTER links users, terminals, personal computers, workstations, peripherals and transport systems into one cohesive, applications transparent network.

It's ready to link async, sync, fax, voice and video users at a lower cost and higher throughput than alternative solutions.

STARMASTER puts you in control of your entire network...giving your computing investment a strategic edge. And because it's a modular system, it can be individually customized to your specific needs and applications.

And it's all backed by Gandalf's full range of support services.

The future. To get there, you've got to have connections.

1-800-PACXNET, EXT. 493
In Illinois: 312-541-6060
In Canada: 613-226-6500

Productivity Through Connectivity™

gandalf

clearly make sense for companies like that to discuss and work together to make sure there is a common standard."

No standards assurance

But analysts warn that the fact that a major American computer systems vendor, HP, is developing a DDAT product for the American consumer market is no assurance that HP will determine DDAT standards.

"We've seen this issue before in Winchester disk drives and optical and tape drives, where there is not a critical mass of suppliers and those who agree on a common format," said Robert Abraham, vice-president of Freeman Associates, a data storage consulting firm in Santa Barbara.

"Even though Sony and HP working together were influential in establishing the 3½-in. floppy disk drive as a standard, it took them a long time to do it," Abraham warned.

It is possible that ANSI could get involved with DDAT. But the fastest route to standardization is usually paved by IBM and the like, Vermeulen said.

"If you look at the speed of setting standards, IBM and big companies do it fastest because of their clout," he said.

"IBM starts building products that others mimic soon after, while ANSI sits down and defines the standards before others start building. I can't think of many successes from that method, not in a fast-moving area of technology," Vermeulen added.

IBM has not announced plans for DDAT systems. Analysts said IBM is often lagging behind current standards in the storage area and is not expected to lead the charge here either.

When DDAT arrives in the U.S. in late 1988, it is expected to compete against existing low-end storage subsystems and future ones as well. "Along with DDAT, we'll have 5¼-in. tape drives, 8mm helical scan drives, optical WORM drives and, soon, erasable optical," Elizer said. "It should be an interesting battle."

Of those, DDAT is expected to be most competitive with erasable optical technology, which is not available but is promised for 1988. "Erasable optical spins round and round, so the access times will be faster," Elizer said. "But there's a question about how expensive erasable will be, and the capacity will not be as high as DDAT."

DDAT products are expected to offer random-access data speeds of 10 to 20 seconds, compared with erasable optical products' 50 to 100-msec speeds. But DDAT's capacity of 1.2G bytes or more far exceeds the erasable optical ceiling of some 50M bytes, according to Elizer.

Competition heating up

Another competitor in the market will undoubtedly be Exabyte Corp. in Boulder, Colo., which this summer began shipping a helical scan storage subsystem based on the 8mm VHS videocassette recorder technology. The Exabyte 8200 can backup data from a variety of computer systems up to 2G bytes at a transfer rate of 256K byte/sec., according to the company.

Exabyte is said to be "shipping thousands" of 8mm video tape drives to OEMs, and a small flurry of product announcements based on that technology is anticipated at Comdex/Fall. At $3,500, the Exabyte 8200 is seen by some as a viable archiving and backup media for high-end microcomputers and mainframes.

Nevertheless, it is still too early to tell who will set DDAT standards, how the computer industry will react to the new media and when prices will fall low enough to make the technology a viable alternative.

"The major significance of the HP-Sony announcement is that, hopefully, they will now lead the industry toward standards," Abraham said. "DDAT recording has a lot going for it — low risk, mature technology, low-cost potential, small size. But it's not going anywhere until the obstacles of standardization have been overcome."

4Word marches over to 1-2-3

CUPERTINO, Calif. — A new version of 4Word, a $99 random-access memory (RAM)-resident word processor for Lotus Development Corp.'s 1-2-3, was introduced last week by Turner-Hall Publishing.

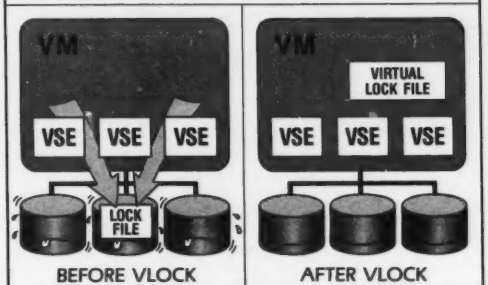
The new release is said to allow users to integrate multiple graphs, spreadsheets and text in a single document. The product can also be used for creating presentations without buying or using separate presentation software packages, according to Tom Byers, general manager of Turner-Hall.

The product, aimed at people who use of 1-2-3 heavily but have modest word processing needs, can be invoked from 1-2-3's main menu and uses a command structure similar to 1-2-3. The package also uses Lotus .WKS files to store documents. By sharing the Lotus file structure, users can print documents using the same command that produces work sheet printouts.

Turner-Hall also addressed a common user complaint, which was that text could spill over into a spreadsheet and damage data. The new version avoids this problem by providing automatic spreadsheet protection.

Another Turner-Hall product, Spellin, a spell checker for 1-2-3 labels, can be used with 4Word. 4Word 2.0 is not copy-protected, uses approximately 60K bytes of RAM and is available now. Current 4Word users can upgrade for $25.

Running Multiple VSE Guests?
Sharing DASD?
Want to Improve Performance?

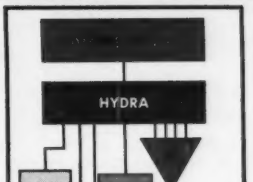


VLOCK Improves VSE Performance!
For a demo, call (415) 938-2620
BMS Computer, Inc., 375 N. Wiget Lane, #210, Walnut Creek, CA 94598

RMSA Cuts Costs With HYDRA®

A Direct Channel Attached Protocol Converter Controller

"HYDRA's 1403 printer emulation has been a real money saver for us. We use Printronix 600 LPM printers defined as 1403's for jobs that would normally require very expensive laser printers. HYDRA's versatility made it possible for us to generate our bar coded inventory tags. Our customers and programmers also appreciate HYDRA's dial-in capabilities."
Steve Brown, Director of Systems Programming for R.M.S.A.



System printer emulation is yours with HYDRA! You can connect laser, dot matrix, and letter quality printers to HYDRA, submit a 1403/3211 print job and watch your inexpensive ASCII printers take on the task of large system printers. 3286/87 terminal printer emulation is also supported by HYDRA. This feature enables you to dial-in from a remote location, using an ASCII terminal or PC, and receive a report on an attached ASCII printer over a single phone line.

Direct connect or access your mainframe from your home, office, or any remote location using a PC or ASCII terminal. HYDRA provides 3270-type terminal emulation, supports most popular ASCII terminals, and features call-back, multi-level password, and programmable log-off security. HYDRA can be interfaced with long distant carriers, networks, and LANs.

Available in 4, 8, 16, 32, and 64 port models. HYDRA operates on IBM 360/370/43XX/30XX and compatible mainframes.

For full details and your closest HYDRA dealer
Call 800-55-HYDRA In California call (714)770-2263

RMSA is a registered trademark of Retail Merchandising Service Automation, Inc.
IBM is a registered trademark of International Business Machines

JDS MICROPROCESSING
2261 Lambert Street, Suite 205, El Toro, CA 92630

NEC releases hard-disk Multispeed laptop

WOOD DALE, Ill. — A hard-disk-drive version of its Multispeed IBM-compatible laptop was announced last week by NEC Home Electronics U.S.A., Inc.

The popular battery-powered laptop was not previously available in a hard disk drive configuration, a feature highly sought by laptop users. The Multispeed HD comes standard with a 20M-byte hard disk drive offering 78-msec access time. The machine will be available next month, NEC spokesmen said.

Like its predecessor, the $3,695 Multispeed comes equipped with a 3½-in. floppy disk drive capable of storing 720K bytes of data or program code and uses an electroluminescent supertwist LCD screen.

No expansion chassis for expansion slots is available, but the machine does have a slot that accepts many modems, the vendor said.

Uses software revamped for PS/2

According to a NEC official, the 3½-in. floppy disk drive accepts software that vendors have reformatted for the IBM PS/2. "Those work just fine," said James D. Bartlett Jr., NEC's marketing manager for computer products in the computer products division.

The 14-lb Multispeed comes wth 640K bytes of nonexpandable random-access memory and uses a NEC V30 processor that runs at either 4.77 or 9.54 MHz. Because the machine's memory is nonexpandable and its V30 processor emulates the Intel Corp. 8086 and not the 80286, the Multispeed will reportedly be unable to run Microsoft Corp.'s OS/2 operating system, due out next year.

NEC is currently being sued by Intel for allegedly infringing on Intel's microprocessor copyrights. According to NEC's Bartlett, users should not be concerned about the lawsuit because a verdict against NEC would only affect future products.

WHY DO SEVEN OF THE "BIG EIGHT" ACCOUNTING FIRMS CHOOSE REALIA COBOL?

Why Realia? Simple. Because we can help the best *stay* the best.

Realia COBOL is the fastest, most advanced application development tool available to bring the power of the mainframe right to your PC. You'll start saving time, money, and resources, whether you're maintaining an old system or creating a new one.

Realia COBOL offers your programmers the quickest compilation and the biggest file capacity of any PC compiler. A 10,000-line program compiles in 76 seconds. A 10,000-record sort takes 43 seconds. Best of all, Realia-compiled programs execute faster than any other PC compiler's. With RealCICS®, you can even handle online CICS programs.

At Realia, we also offer you something that has become a bit of a contradiction in terms: genuine support for a micro software product.

Realia COBOL—simply the best choice.

REALIA®

10 South Riverside Plaza, Chicago, IL 60606 • (312) 346-0642 • Telex 332979

Mac

CONTINUED FROM PAGE 37

ler, marketing vice-president for Apple software subsidiary Claris Corp. "There have been others that don't run at all. But those have been few and far between."

Incompatibility problems ranged from software packages unable to take advantage of the Mac II's display capabilities to a complete inability to function. "Some didn't run; some just had weird things happen," said Lee Coven, manager of technical computing systems for Lockheed Missiles and Space. "Incompatibility can be defined as something as minor as things looking different on the screen than they looked on the old machine," said John Dubois, senior technical consultant at Seafirst Corp., a Seattle-based subsidiary of Bankamerica Corp.

Revisions to the operating system — and, in a number of cases, the Mac II's more powerful Motorola, Inc. 68020 microprocessor — appear responsible, users said. "The operating system has experienced several small evolutions since the introduction of the Mac Plus in 1986," Dubois explained. "There are likely to be more revisions with Multifinder."

According to one user who tested the Mac II, as much as 70% of previously issued Mac software did not work with the Mac II. By the time the product was introduced in the spring, compatibility had increased to between 80% and 90%, the result of refinements to the system before its launch.

Today, Apple claims that more than 90% of current Mac software runs on the Mac II. Users can obtain upgraded versions of their current Mac software packages from Apple dealers. "It took a couple of months before the update," Dubois said. "Certainly all the software we care about is compatible."

Currently, users appear content with the amount of software available for the Mac II. "The bulk of our usage centers on a few packages," said Steven Morelli, general manager of financial planning and control for H. J. Heinz Co. "There doesn't seem to be any compatibility issues with those packages. Historically, software packages that haven't run on upgraded versions of the Macintosh were always programs that somehow didn't comply with Apple's guidelines for third-party software development. That makes me more uncomfortable with the package than Apple's hardware."

Rocky ride for users?

Multifinder could cut short the Mac II's honeymoon with users, and it could extend software incompatibility problems to the Mac SE and Mac Plus, which will also be shipped with Multifinder. One user beta-testing the system said Multifinder creates further compatibility problems.

"With Multifinder, it's going to be somewhat rocky for the next six to 12 months," the user said. Communications software packages are among the most likely to be impacted, he added, explaining that Multifinder's multitasking capabilities cause glitches with some packages.

"Some communications software packages are unable to recognize when they're being switched out in favor of another task," the user explained. "They're not incompatible in the sense that they fail, but they tend to behave erratically. You don't want a software package that sometimes misbehaves."

WEEKLY.

Things have a way of changing rapidly in the computer business. Like yesterday. And that's why COMPUTERWORLD comes to you weekly. Get 51 issues for just $38.95. Plus 12 issues of COMPUTERWORLD FOCUS for news analysis all year long.

COMPUTERWORLD.
Keeping Up With Today. Anticipating Tomorrow.

Fill out and mail in the attached postage-paid envelope.

Please enter my subscription to COMPUTERWORLD at the low Special Introductory Rate of just $38.95 for 51 issues, a savings of over $5 off the basic rate! Plus, I'll receive all 12 COMPUTERWORLD FOCUS issues FREE with my subscription.

☐ Payment enclosed ☐ Bill me
☐ Charge my credit card ☐ AmEx ☐ VISA ☐ Mastercard

Signature _____ Card Expires _____

FIRST NAME | M.I. | LAST NAME

TITLE

COMPANY

ADDRESS

CITY | STATE | ZIP

Address shown: ☐ Home ☐ Office

☐ I'm already a subscriber, but I'd like to extend my subscription at this special low rate. (Attach mailing label above.)

Canada, Central & South America $110/ Europe $165/ All other countries $245 (Airmail).
Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for the special introductory rate.

Basic Rate: $44

COMPUTERWORLD

Detach here, place in envelope, and seal securely.

Please indicate your business, function, and computer involvement below.

1. BUSINESS/INDUSTRY (Circle one)
10. Manufacturer (other than computer)
20. Financial/Insurance/Real Estate
30. Medicine/Law/Education
40. Wholesale/Retail/Trade
50. Business Service (except DP)
60. Government—State/Federal/Local
65. Communications Systems/Public Utilities/Transportation
70. Petro Chem, Mining, Construction, Agriculture
80. Manufacturer of Computers, Computer-Related Systems or Peripherals
85. DP Service Bureau/Software/Planning/Consulting
90. Computer/Peripheral Dealer/Distributor/Retailer
75. User: Other _____
95. Vendor: Other _____
(Please specify)

2. FUNCTION (Circle one)
IS/MIS/DP MGT
19. Vice President, Asst. VP
21. Dir., Mgr., Suprv., IS/MIS/DP Services
22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
23. Dir., Mgr., Suprv., Analyst, of Systems
31. Dir., Mgr., Suprv., of Programming
32. Programmer, Methods Analyst
35. Dir., Mgr., Suprv., OA/WP
38. Data Comm. Network/Systems Mgt.
OTHER COMPANY MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President/Asst. VP
13. Treasurer, Controller, Financial Officer
ENGINEERING
41. Engineering, Scientific, R & D, Tech. Mgt.
SALES
51. Manufacturing Sales Reps., Sales/Mktg. Mgt.
OTHER PROFESSIONALS
60. Consulting Mgt.
70. Medical, Legal, Accounting Mgt.
80. Educators, Journalist, Librarians, Students
90. Others _____
(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.
A. Mainframes/Supermins
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems
F. No Computer Involvement

538739-6

Belove

FROM PAGE 37

What percentage of users need these features?
If you look at those users who find performance lacking and are running out of memory, it is a small percentage. But users follow a bell curve, and that curve is constantly shifting toward expecting increased functionality.

What should MIS be doing in terms of investing in hardware today? OS/2 will require an 80286 processor and lots of memory, and the Presentation Manager will add high-resolution graphics and a mouse to those requirements.
A lot of those are add-ons. Memory and mice can be added at the point they are needed. Some of the graphics pieces and the basic processor are different. It is a matter of looking at your own users and their level of sophistication and understanding to discover how long it will take to make the transition to graphics interfaces and what kind of requirements they have.

How can MIS get a handle on these transition issues?
Talk to your vendors. Understand their direction and help, at this point, to influence it. Get your two cents in. The other piece is listening to users, which MIS has been doing a lot of with their PC users.

Should MIS begin determining which users to move to OS/2?
To some extent they will self-select, in the same way users selected PCs before MIS really knew. MIS has become sophisticated enough to understand that the user drives the process.

It is, however, the time to start determining some of that, of saying what the transitional strategy is. Presumably, most corporations have a large investment in current hardware and software, and that is the investment you shouldn't throw out.

For example, the OS/2 version of 1-2-3 will be able to interchange data, templates, etc. with the MS-DOS version, so people will be able to live in mixed environments. You will not have to convert everyone, wholesale, over to a graphical interface of OS/2.

What will happen to my performance with a 286 machine running multiple applications, at least one of which is graphical?
Your performance with multiple applications will not be the same as running a single application. Because something else is running and sharing the CPU, there aren't the same number of cycles available to the foreground application. You will have some performance degradation.

The minute you turn on protected mode you lose some performance. But you will get that performance back in a few ways. More memory is available to the program, so we can design them differently. Your actual throughput running a single application may slow up, but overall, with the ability to let things run in the background and have things occur without waiting, your overall productivity will be higher.

Is a well-engineered 286 machine adequate for running multiple tasks under OS/2?
It depends on what you are doing. Different applications will have different characteristics. If I set up something in the background that is very compute-bound, just crunching numbers, clearly that will affect my foreground performance a lot more than something that is maybe a communications application running at a low speed. When you get into graphics where so much of the processor is tied up just retaining the screen, there will be some performance limitations.

How much will a 386 help eliminate potential bottlenecks?
It will help alleviate them, but it won't eliminate them. I have a Compaq 386 on my desk right now, and I can, in DOS 3.0 running graphical applications, bring it to its knees with some pathologic cases.

What are the risks for corporations that are first to go to OS/2 and OS/2 applications?
There are risks, but I have to assume that most corporations are sophisticated enough to not just go out and buy hundreds of copies of OS/2 and the new applications. In every case they have people in their experimental labs or evaluation labs, and those are going to be the first users.

Will it be difficult to maintain software compatibility when moving to OS/2?
You will need some new file formats as you add functionality, but what we are going to be doing is providing that in an invisible way. For example, 1-2-3 Release 3 will read and write Release 2 files.

How will Lotus deal with future competition?
We are expanding vertically. We will be extending the capabilities of 1-2-3; 1-2-3/M is the first step in that direction, of compatibly offering people a spreadsheet that will run across the range of platforms that their corporations are going to need and have in the future. That will tend to reinforce 1-2-3's position, because it will be the standard to use across all hardware platforms.

Hurry up

FROM PAGE 37

ible? With few exceptions, it just isn't here yet, and users are getting bored silly.

The root of the problem, it seems, is that the bigger software vendors are spending an inordinate amount of time working on software for the new, unproven and unshipped OS/2 operating system.

Meanwhile, users of Ashton-Tate's Dbase III and Lotus Development Corp.'s 1-2-3 patiently keep loading the same old software, with no hope of a dramatic breakthrough until next year.

And even if OS/2 breakthroughs arrive, this software will only affect the upper echelon of micro users — those who can afford the high cost of the next generation.

The OS/2 applications ware will probably cost more, and the hardware requirements will undoubtedly add up to quite a few bucks.

Users who are either too poor to move up, or happy with an Intel 8088 machine but are seeking more "oomph" from their software, will have to wait almost as long as those early OS/2 adopters.

Next year's models
It will most likely not be until next year that Dbase IV and 1-2-3 Release 3, both set to run on the MS-DOS 3.0 environment, hit the streets.

Much of the disturbing lack of innovation comes with the increasing control of the market by a few well-heeled vendors bent on preserving a profitable status quo. When innovative software does appear, the standardization around older core products keeps such packages from reaching their potential. As a result, the exciting software that does exist rarely makes it to a user's desk.

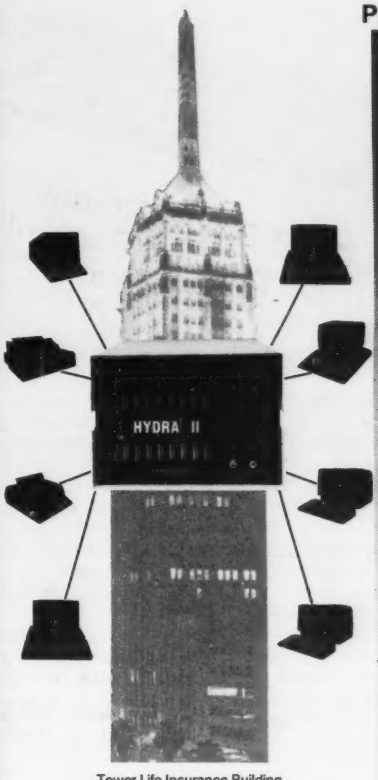
The drawn out delivery of OS/2, the mixed success of Microsoft Windows and the increasing oligopilization of the software business has made the PC environment fallow ground for software.

Meanwhile, many good ideas have been implemented on the Macintosh. But it is a shame to have to buy a new machine just to reach a higher software plane.

Barney is *Computerworld's* senior editor, microcomputers.

TOWER LIFE STANDS TALL WITH HYDRA®

A
Direct Channel Attached
Protocol Converter/Controller



Tower Life Insurance Building
San Antonio, Texas

"HYDRA has exceeded our expectations. We are amazed with the flexibility and simplicity that HYDRA offers. We use HYDRA to drive laser printers as 3211 system printers, support several types of ASCII terminals, and for PC to mainframe file transfer. For both local and remote applications HYDRA has been a tremendous help. We didn't even need a system programmer to set everything up." **Buddy Allee, Data Processing Operations Manager for Tower Life Insurance Company.**

Fiexible Because....

HYDRA supports virtually any ASCII asynchronous RS-232 device including terminals, PCs, printers, bar code readers, document scanners, etc. You can direct connect or communicate from your office, home, or any remote location over voice-grade phone lines.

HYDRA provides 3270-type emulation for ASCII terminals and PCs, 1403/3211 system printer and 326X emulation for serial ASCII printers, and supports several PC to mainframe file transfer packages.

HYDRA ensures maximum security with use of its multi-level password, call-back, and positive log-off security features.

Easy To Use Because....

HYDRA requires minimal set-up for normal use, has many popular terminals already defined, and can be quickly custom configured from any defined terminal or PC.

Available in 4, 8, 16, 32, and 64 port models, HYDRA operates on IBM 360/370/43XX/30XX and compatible mainframes.

For full details and your closest HYDRA dealer
Call **800-55-HYDRA** In California call **(714)770-2263**
and find out how HYDRA will benefit *your* data processing center

TOWER LIFE is a registered trademark of Tower Life Insurance Company
IBM is a registered trademark of International Business Machines

JDS MICROPROCESSING
22661 Lambert Street, Suite 206, El Toro, CA 92630

NEW PRODUCTS

Systems

Factory automation systems providing distributed numerical control (DNC) and communications using an IBM Personal Computer and the Unix operating system have been announced by **CAD/CAM Integration, Inc.**

The **Series 1000 Factory Automation Systems** provide two-way electronic data transport of manufacturing information between a computer-aided design, manufacturing or engineering or DNC prep system and automated equipment on the shop floor.

All Series 1000 products support Ethernet and broadband local-area networks. Pricing starts at $7,500, including a 16-channel multiplexer, the Unix operating system, RS-422 or RS-232 communications, a full-screen editor and protocols.

CAD/CAM Integration, 80 Winn St., Woburn, Mass. 01801.

Software applications packages

Check-processing software for the banking industry said to support the IBM Personal System/2 and the IBM 3118 Page Scanner for signature scanning and verification has been announced by **SQN Peripherals, Inc.**

SQN Veritas software permits the capture of single and multiple signatures from application cards with data base storage and retrieval for up to one million signatures. It can also append name, account data and messages for each signature.

A complete SQN Veritas PS/2-based system with hardware for 65,000 signatures costs $17,000.

SQN Peripherals, Box 423, 65 Indel Ave., Rancocas, N.J. 08073.

A-Cross, a personal computer cross-tabulation program, has been announced by **Strawberry Software, Inc.**

A-Cross is said to be a multitasking data-analysis tool. It can create, compute and print tables simultaneously. According to the vendor, users do not need to know a command language. Formulas, which define variables, are translated into English on screen. Rows and columns are displayed in spreadsheet form as they will appear in finished tables.

A-Cross is priced at $995. A runtime version, limited to a single data base, costs $85.

Strawberry Software, 42 Pleasant St., Watertown, Mass. 02172.

A software program designed to automate the task of filling in the blanks on forms and documents has been announced by **Softstream Technologies, Inc.**

The program, called **Blankity Blank**, works directly with certain word processing programs to merge standard information into the appropriate places or blanks in each form.

The user creates an unlimited number of questionnaires that can contain up to 1,000 questions each. Questions and answers can be edited at any time. Math equations can be used as questions; the software automatically calculates the answers.

Blankity Blank runs on IBM Personal Computers or compatibles. It costs $99.50 plus $5 for postage and handling.

Softstream, 2740 Hollywood Blvd., Hollywood, Fla. 33020.

DB Graphics, a presentation software graphics package said to allow users to read Ashton-Tate's Dbase III and Dbase III Plus as well as the vendor's own R:Base data bases directly, has been announced by **Microrim, Inc.**

Users of other data base programs, such as Dbase II and Lotus Development Corp.'s 1-2-3 and Symphony, can use DB Graphics after translating into the ASCII, Dbase II or III Plus or R:Base data formats. DB Graphics can also be used as a stand-alone package.

Users can sort and group fields, create variables for graphing and make use of conditional operators. Features include eight graph types, seven text fonts and up to 16 simultaneous colors. Up to 32 windows of split-screen displays are available.

DB Graphics costs $295 in both 5¼- and 3¼-in. formats.

Microrim, P.O. Box 97022, 3925 159th Ave. N.W., Redmond, Wash. 98073.

A Lotus Development Corp. 1-2-3 add-in program that permits users to operate on Ashton-Tate Dbase-compatible files directly from the active Lotus spreadsheet has been announced by **Triple C Software, Inc.**

The program, called **DB12 III**, allows transferred data to be filtered in accordance with qualification criteria placed directly in the worksheet. It uses 1-2-3 commands and functions.

DB12 III runs on IBM Personal Computers and compatibles and requires 1-2-3 Version 2.0 or higher. It costs $149.

Triple C, Suite 217, 800 W. Oakland Park Blvd., Fort Lauderdale, Fla. 33311.

A line of integrated office automation applications designed to run under Microsoft Corp.'s Windows has been announced by **Palantir.**

The **Windows Office Automation Series** offers multisoftware applications,

The most modem. For the leased price.

LIMITED OFFER $19.95/month*
Special lease price on Racal-Milgo RM-4800 leased line diagnostic modems.

Always the first name in quality... now the last word in price.

If you thought you couldn't afford Racal-Milgo modems, our special lease program on the RM-4800 will make you think again. Now you *can* have Racal-Milgo modems...at less than half our normal lease rate of $40/month.

The RM-4800 brings you all the sophisticated features you could want. Like soft strapping, complete built-in local and remote tests, CCITT V.27 compliance, standalone or high-density central site card versions, multiport option,** and much more. And it comes with our standard, full one-year factory warranty.

What's the catch? Frankly, we're temporarily cutting the RM-4800 lease price to introduce as many people as possible to our economical RM Series of leased line diagnostic modems. Because we're confident that once you get used to Racal-Milgo quality, performance, and reliability, you'll never settle for anything less.

What's more, the regular prices on other models in the RM Series are very affordable. For example, our RM-9629 9600 bps modem starts at $44/month.† And our 14.4 Kbps model, the RM-1433, is available from $75/month.†

Can you afford not to get the full story on the RM-4800, as well as the rest of the RM Series? Call today. Quantities are limited.

Call toll-free 1-800-327-4440.
In Florida, call 305-476-4277.

Racal-Milgo®

RACAL

* Minimum 36-month lease. Offer good in U.S.A. only. Attractive purchase option also available.
** Slightly higher price.
† 60-month lease rate. 36-month lease and purchase option also available.

including productivity tools and utilities. All products in the series are said to be able to share text, data and graphics.

Software in the series includes a desktop communications program, a resource scheduler, a spreadsheet, a flat-file data base application, a font editor, an image data base, a paint-and-graphics application, an image scanner and editor and a word processor.

Prices range from $80 to $1,200.

Palantir, Suite 100, 12777 Jones Road, Houston, Texas 77070.

Superproject Expert, a resource and project-management software package for IBM Personal Computers and compatibles, has been announced by **Computer Associates International, Inc.**

Superproject Expert is said to incorporate such project management features as interactive outline and work breakdown structure, local-area network capability, customizable reports and micro-to-mainframe links.

Other features include job-oriented scheduling, multiproject capabilities, import/export network capabilities, detail costing information, graphics capabilities and built-in word processing capabilities.

Superproject Expert is priced at $695.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

Software utilities

A real-time high-resolution graphics-oriented performance measurement tool for IBM's MVS/370 and MVS/XA has been announced by **Forthright Systems, Inc.**

The IBM Personal Computer-based **Forthright Real-time Environmental Display** (FRED) captures real-time graphics displays from IBM's RMF Monitor II on-line displays and instantaneously transforms them into graphics. More than 45 predefined color displays of MVS events and status indicators are included.

FRED also features remote-connect capabilities that give centrally located users the ability to monitor the performance and service levels of remote sites.

FRED is licensed starting at $5,000.

Forthright, 490 Lakeside Drive, Sunnyvale, Calif. 94086.

A personal computer version of a software package said to automatically document Information Builders, Inc.'s Focus has been announced by **Adventureware, Inc.**

PC/4th-Write establishes read access to Focexecs and Masters, parses out the essential data, loads the data into a Focus data base and produces nine systems manual reports.

Features include on-line query, screen image-fill creation and the ability to produce a file containing only the key or core statements in Focexecs.

PC/4th-Write is available for CMS and PC/Focus. The mainframe and PC versions are said to be compatible so that systems can be documented at one level and stored at another.

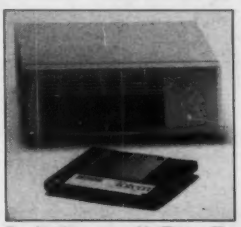
PC/4th-Write costs $600.

Adventureware, 3434 Huntertown Road, Allison Park, Pa. 15101.

Data storage

Bering Industries, a subsidiary of Mountain Computer, Inc., has added the **Totem II** to its Totem line of 20M-byte removable Bernoulli storage subsystems for Apple Computer, Inc.'s Macintosh computers.

Totem II features a single



Bering's *removable Totem II*

20M-byte, 5¼-in. removable Bernoulli cartridge packaged in a 3-in. box. Each cartridge is said to hold the equivalent of 10,000 pages of information.

Also announced was Bering's Totem backup and restore software for all Totem and Totem II drives.

Totem II is priced from $1,195.

Bering, 280 Technology Circle, Scotts Valley, Calif. 95066.

Three families of fixed- and removable-disk storage products for the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II have been announced by **Mountain Computer, Inc.**

The **Micro Bernoulli** is available in single and dual 20M-byte removable cartridge versions; the **Filesafe** is an external hard disk in capacities ranging from 20M to 80M bytes; and the **Micro Bernoulli Combo** units are a combination of 20M bytes of removable cartridge storage with a choice of 20M-, 40M- or 80M-byte hard disks.

The units interface to the small computer systems interface (SCSI) port on the Macintosh Plus and Mac SE and to an SCSI card on the Mac II.

Micro Bernoulli prices range from $1,895 to $2,795, and Filesafe prices range from $1,095 to $3,395. The combination units cost from $2,695 to $4,495.

Mountain Computer, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

Four external products said to transport data between the IBM Personal Computer family and the IBM Personal System/2 line have been announced by **Sysgen, Inc.**

The **3½-in. Bridge File**, priced at $325, provides a two-way link with 720K bytes and 1.44M bytes of floppy-disk storage. The **5¼-in. Bridge File**, priced at $325, offers 360K bytes and 1.2M bytes of floppy-disk storage.

Bridge Tape, priced at $795, provides a tape-unit capacity of 42M bytes to port data to all the PCs and the PS/2 line. It also serves as a tape backup unit for both types of personal computer. The **External Durapak**, a $1,595 removable hard-disk subsystem, provides 15M bytes of memory storage.

Sysgen, 556 Gibraltar, Milpitas, Calif. 95035.

An optical-storage subsystem and software device driver for IBM Personal Computers and compatibles has been announced by **Micro Mart, Inc.**

The system, called the **MMI-100 Optidriver**, allows the users to access a write-once read-many optical disk drive as if it were a Winchester drive, the vendor said.

Users can reportedly run most application programs directly from the optical disk, use standard Microsoft Corp. MS-DOS functions on the optical drive, have multiple device drivers on the same system and access 200M bytes per side of a cartridge.

Available in an internal version, which fits in an 8-bit slot in the PC, and an external version, the MMI-100 costs $6,495.

Micro Mart, Suite 109, 8620 N. 22nd Ave., Phoenix, Ariz. 85021.

Development tools

Aries Technology, Inc. has introduced **Aries CP1100**, a Compaq Computer Corp. Deskpro 386 version of its **Conceptstation** desktop mechanical computer-aided engineering (CAE) tools.

The system is a desktop computer environment that includes solid geometric modeling, materials management, analysis, communications and access to personal productivity software.

The CP1100 upgrades the

Continued on page 44

AlohaAirlines Takes Off With HYDRA®

A Direct Channel Attached Protocol Converter/Controller

"As Hawaii's premier interisland carrier, it is vital for the information we transmit to reach its destination. This is why we chose the HYDRA. It enables us to use local and remote (including mainland) PCs to communicate important data to/from our mainframe. We also download files containing member lists into PCs for preparation of personalized letters, for example, to our frequent fliers. We have been very impressed with HYDRA's performance."
Natalie N. Playdon, Director-Computer Services, Aloha Airlines

Because HYDRA offers ....

Convenient access to an IBM mainframe via telephone lines, allowing customers and staff to dial-up from their office, home, or any remote location.

Call-back security that hinders unauthorized callers from accessing data. In addition, if the telephone line inadvertently drops, HYDRA instantly goes through a predefined log-off sequence preventing unauthorized access to important files. And, with HYDRA's multilevel password security, different ranges of access can be allocated.

PC to host file transfer with several powerful software packages to choose from. Most operating systems supported, including MVS,DOS,VM under CICS and VM/CMS, DOS/VSE, MVS/TSO.

3270-Type emulation for ASCII terminals and PCs. Select from over 40 ASCII terminals defined in ROM, or add your own terminal definitions. In addition, HYDRA provides quick screen updating, will not lock the keyboard, and allows predefined keystroke sequences to be executed using one or two keys.

Support for local or remote ASCII printers as 1403/3211 or 3286/87 printers. Submit system printer jobs to inexpensive serial ASCII printers. Or attach an ASCII printer to a remote PC or terminal and receive a report.

Direct channel attachment: No remote software is needed as all devices appear local, and no additional controller is required. Direct attachment to CPU minimizes response time.

Natalie N. Playdon
Director - Computer Services
Aloha Airlines

Connect *Your* ASCII Terminals, PCs, and Printers with HYDRA®

Call today! **800-55-HYDRA** In California (714)770-2263

For full details and your closest HYDRA dealer.

IBM is a registered trademark of International Business Machines. AlohaAirlines® is a registered trademark of Aloha Airlines, Inc.

JDS MICROPROCESSING
22981 Lambert Street, Suite 206, El Toro, CA 92630

Continued from page 43

Deskpro 386 to a stand-alone mechanical CAE system that includes Aries's proprietary graphics accelerator, a 256-color, 1,024- by 770-pixel monitor and a three-button mouse.

The CP1100 Conceptstation is base-priced at $21,850, not including personal computer, memory and disk options.

Aries, 650 Suffolk St., Lowell, Mass. 01854.

Master, a personal computer-based system for the analysis, design and documentation of data base applications, has been announced by **Infodyne, Inc.**

Developed by GESI in Rome, Master is said to support all design activities relating to the conceptual, logical and physical model of data and processes in an information system. It produces various levels and documentation, integrates local subschematica into the global design and converts the conceptual entity-relationship (ER) design into the relational model.

The basic module costs $1,900. Modules for generating the ER schema of the application and data flow diagrams and for producing standard ASCII files with the description of the data base structure cost from $495 to $795.

Infodyne, Suite 200, 227 S. Main St., South Bend, Ind. 46601.

Software enhancements

An enhanced version of the **PMS-II Project Manager System** has been announced by **North America MICA, Inc.**

Version 8.0 includes on-screen bar charts, an interactive on-screen logic diagram, an on-line diary and a comprehensive on-line technical reference manual accessible from anywhere in the program. New capabilities include a pop-up calculator, a global editor, internetwork dependencies and an interrupt feature.

Version 8.0 of the PMS-II Project Management System costs $1295.

North America MICA, Suite 110, 5230 Carroll Canyon Road, San Diego, Calif. 92121.

Version 2.0 of the **AMX** real-time multitasking operating system for Intel Corp. 8086, 80186 and 80286-based microprocessor systems has been announced by **Kadak Products, Ltd.**

AMX is said to support 100 application tasks with up to 1,024 interval timers and 4,096 envelopes for message-passing to tasks.

Features include resource protection, even and task-synchronizing capabilities and fixed and dynamic allocation of memory for use by concurrently executing processes.

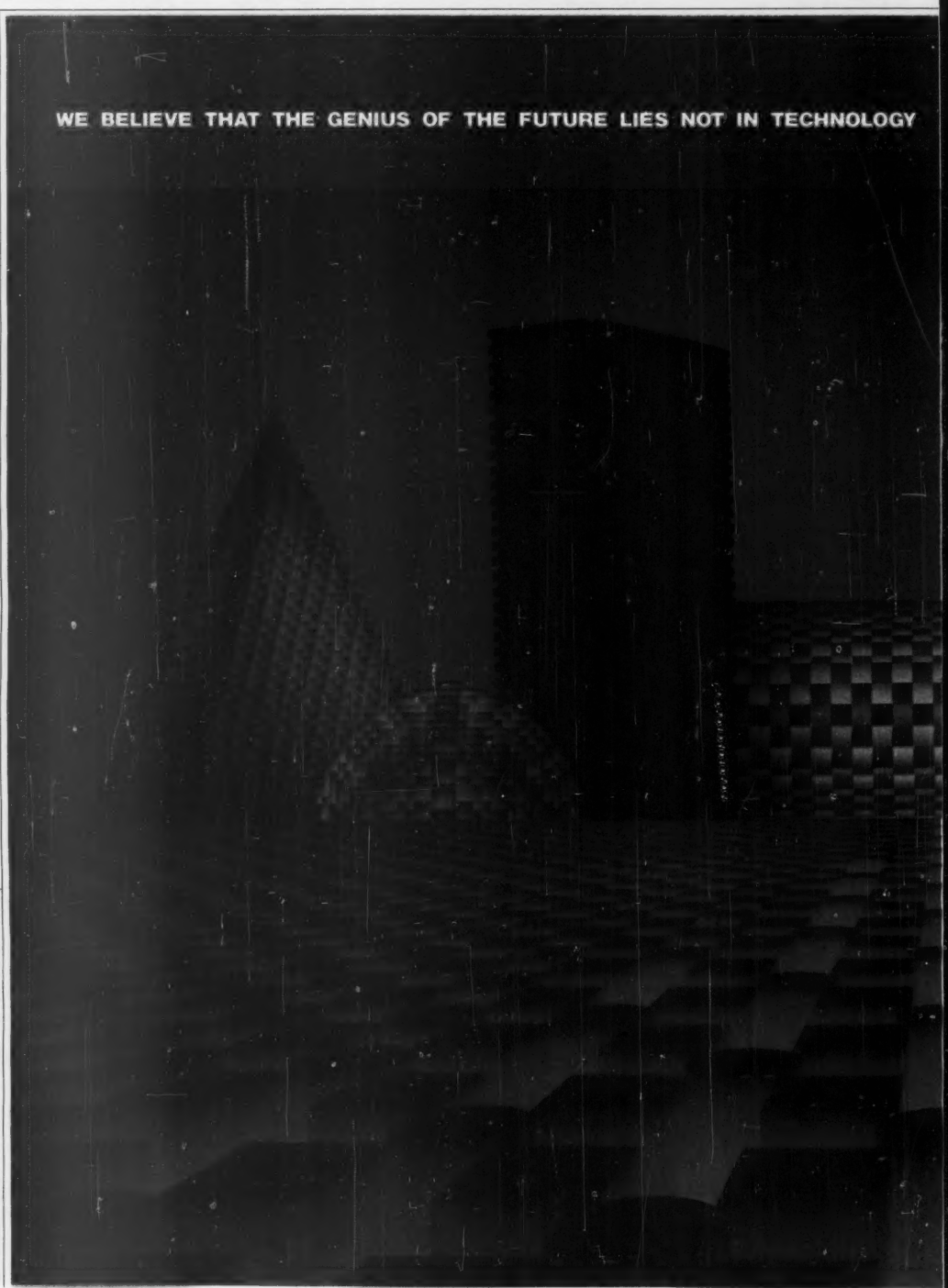
According to the vendor, when used on an IBM Personal Computer, PC XT or AT, AMX permits critical real-time event processing concurrently with IBM PC-DOS operations.

Applications using AMX can be developed using C or assembler. The AMX multitasking package costs $2,195.

Kadak, 206-1847 W. Broadway Ave., Vancouver, B.C., Canada V6J 1Y5.

A version of the **Irecognize** IBM Personal Computer-compatible image-recognition software, designed for use with the Palantir Recognition Server, has been announced by **Ibase Systems Corp.**

When used in conjunction with one central-recognition engine, Irecognize 2.0 is said to allow information and images stored on magnetic tape or opti-



DISTRIBUTOR INVENTORY REDUCTION SALE

CONVERGENT TECHNOLOGIES COMPUTER SYSTEMS

☐ NEW, IN BOX
☐ FULL WARRANTY
☐ LOW PRICES

Call David Edwards
1-800-527-0593
In Texas 214-680-9700

cal disk to be taken from multiple workstations and processed immediately or transferred to hard disk for later processing.

Features include automatic processing of up to 64 forms; verification editing; control of post-processing document formatting; and built-in personal computer communications.

Irecognize Release 2.0 costs $6,000. Bundled with the Palantir recognition server, it costs $29,500.

Ibase Systems, One S. Park Ave., San Francisco, Calif. 94107.

Welcom Software Technology has announced an updated version of its Microsoft Corp. MS-DOS-based project management system, **Open Plan 3.0**.

New features include contact-sensitive Help messages; access to auxiliary data files during activity-file update; the ability to store and access data on a drive separate from the software; support for the 43-line mode of IBM Enhanced Graphics Adapter boards; and zoning logic and time-phased drawings.

The product also features alternative presentation styles for logic and time-phased logic drawings, batch reporting and automatic subheading and subtotaling to 10 levels.

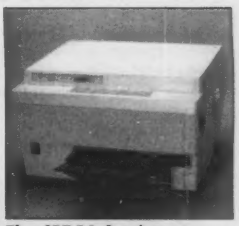
Open Plan 3.0 offers critical-path analysis and resource scheduling on arrow- and precedence-project networks of up to 32,750 activities. It costs from $4,200.

Welcom, Suite 125, 1325 S. Dairy Ashford, Houston, Texas 77077.

Printers/Plotters/Peripherals

A desktop laser printer supporting Adobe Systems, Inc.'s Postscript page-description language has been announced by **CPT Corp.**

The **CPT PS-8** printer features output speed of eight



The CPT PS-8 *printer*

pages per minute. It has 35 resident typefaces, each of which may be rotated and scaled to any size, the vendor said. Text with line art and halftones can be accommodated on one page.

Emulations of Hewlett-Packard Co.'s HP Laserjet Plus, HP 7475 Pen Plotter and Xerox Corp.'s Diablo 630 are supported. The CPT PS-8 can be connected to the CPT 9000 or any IBM Personal Computer or compatible through a serial interface. It can connect to an Apple Computer, Inc. Macintosh through an Appletalk interface.

The CPT PS-8 costs $5,800.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

Saba Technologies, Inc. has begun shipping Version 2.0 of its **Handscan** hand-held data entry device that allows users of IBM Personal Computers to enter portions of documents directly into PC software programs.

Enhancements include the ability to read additional typestyles and text with underlining as well as improved accuracy when dealing with partially formed characters or those that touch other characters.

Handscan reads characters generated from typewriters and word processors, mainframe laser printers and near-letter-quality dot matrix printers.

Handscan Version 2.0 is priced at $649.95.

Saba Technologies, 9300 S.W. Gemini Drive, Beaverton, Ore. 97005.

ALONE, BUT IN THE ABILITY TO MANAGE IT.
Information Technologies.
Over Your Head? Or Overview?
This system looks viable. So does that one. While yet another does almost as much at a much lower cost.
How do you know which is right for your business? The answer is, there may be no single answer. In today's ever-evolving, high-tech world of business information, any one system or product is only part of the solution. Part of a long-range, in-depth systems architecture. A plan. Specific enough to answer today's needs. Open enough to provide for tomorrow.
Who can help you with that kind of thinking?
We can.
We're Bell Atlantic. And we can show you the bigger picture. With the kind of end-to-end expertise most companies can't offer. From local telephone and mobile communications to voice/data networks and business information systems. From computer maintenance and software to equipment leasing and financing, we can put it all together.
We're an integrated family of companies offering a broad range of solutions to your information and communications needs. And with our unmatched record of innovation, reliability and experience in moving information, we'll help you find the surest route to business success.
For more information about the Bell Atlantic companies, call toll-free 1-800-621-9900.
Bell Atlantic
WE MAKE TECHNOLOGY WORK FOR YOU.
LOCAL TELEPHONE AND MOBILE COMMUNICATIONS
Bell of Pennsylvania • C&P Telephone • Diamond State Telephone • New Jersey Bell • Bell Atlantic Mobile Systems
INFORMATION AND COMMUNICATIONS SYSTEMS
Bell Atlanticom • Bell Atlantic Business Supplies • Bell Atlantic International • A Beeper Company • CompuShop • Bell Atlantic Business Center • MAI Canada • Telecommunications Specialists, Inc.
COMPUTER MAINTENANCE AND SOFTWARE
Sorbus • Technology Concepts, Inc. • Electronic Service Specialists, Ltd.
DIVERSIFIED FINANCIAL SERVICES
Bell Atlantic TriCon Leasing • Bell Atlantic Systems Leasing • Bell Atlantic Properties

PROMPT
DBMS
FOR THE
IBM SERIES/1
800-626-5518
502-633-5700
EDI & APPLICATIONS TOO!

A laser printer/plotter called the **Laserimage 3000** that is said to feature a 15 page/min. print speed has been announced by **Personal Computer Products, Inc.**

The Laserimage 3000 offers built-in emulation of the Hewlett-Packard Co. HP Laserjet 500 Plus; the Epson America, Inc. FX-80; the IBM Graphics Printer; and the partial HP plotter. Optional pop-in cartridges provide emulation of the HP GL 7470 plotter.

Features include 1.5M bytes of memory; 300 by 300 dot/in. resolution; 31 standard fonts, which operate in portrait and landscape mode; and full bit-map, mixed-test, graphics and raster- and vector-graphic capabilities.

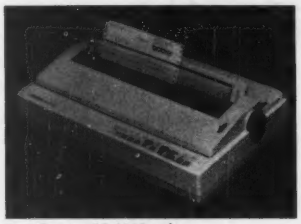
The Laserimage 3000 printer is priced at $6,395.

Personal Computer Products, 11590 W. Bernardo Court, San Diego, Calif. 92127.

A high-speed data processing and color graphics printer, designed to produce invoices, reports, spreadsheets and other data-sensitive documents, has been introduced by **Brother International Corp.**

The **Brother M-4018** prints at 480 char./sec. in draft elite and 400 char./sec. in draft pica. Two parallel rows of nine pins each operate simultaneously to produce two columns of data.

For word processing, the M-4018 offers a speed of 100 char./sec. in double-pass and 67 char./sec. in triple-pass mode. Users can select type styles, fonts and other options from front-panel buttons. For color, users can attach the optional four-color ribbon.



Brother's *M-4018 printer*

The M-4018 offers Epson America, Inc. and IBM emulation and parallel and serial interfaces.

The M-4018 costs $1,695.

Brother, 8 Corporate Place, Piscataway, N.J. 08854.

A version of the **Microbuffer In-Line** stand-alone printer buffer, upgraded from 256K to 1M byte, has been introduced by **Practical Peripherals.**

The 1M-byte Microbuffer In-Line features a 38K bit/sec. data-transfer rate. Front-panel controls permit users to clear buffer memory, pause operations and reproduce the last document up to 255 times without computer intervention. The 1M-byte Microbuffer can also reportedly be used as a buffer for a modem or plotter.

The 1M-byte Microbuffer costs $199.

Practical Peripherals, 31245 La Baya Drive, Westlake Village, Calif. 91362.

A 24-wire dot matrix printer, available in both monochrome and color models, has been introduced by **Fujitsu America, Inc.**

In draft mode, the **DL5600** charts 486 char./sec. in 12 char./in. and 405 char./sec. in 10 char./in.

In report mode, the DL5600 is said to print at 324 char./sec. in 12 char./in. and 270 char./sec. in 10 char./in.

Letter-quality speeds are 162 char./sec. in 12 char./in. and 135 char./sec. in 10 char./in.

The DL5600 comes with an English LCD operator panel.

Fujitsu said the printer's noise level is 55 adjusted dB, with a mean time between failures of 8,000 hours.

Features of the printer include automatic change from continuous to cut-sheet paper and a tilted bidirectional tractor with rear-bottom feed. Forms are fed at 9 in./sec.

The DL5600 is priced at $2,195 for the monochrome version and $2395 for the color version.

Fujitsu, 3055 Orchard Drive, San Jose, Calif., 95134.

A 24-pin printer offering four print speeds has been introduced by **Okidata**, an Oki America Company.

The **Microline 393** offers a top speed of 450 char./sec. in high-speed draft mode, an 80 char./sec. near-letter-quality speed, a 120 char./sec. letter-quality mode and a 360 char./sec. utility mode.

Paper-handling features of the Microline 393 include automatic switching between continuous-form and cut-sheet paper, a hinged tear bar, support for up to four-part forms and the ability to feed paper from the bottom, rear or top of the machine.

Other standard features include serial and parallel interfaces and bit-image graphics resolutions up to 360 by 360 dot./in.

The Microline 393 costs $1,399 for the black-print model and $1,499 for the color model.

Okidata, 532 Fellowship Road, Mt. Laurel, N.J. 08054.

A 14-in. fine-dot-pitch IBM Personal System/2 Video Graphics Adapter (VGA)-compatible monitor has been announced by **Mitsubishi Electronics America, Inc.**

The **Model XC-1492C** features a 13V, 14-in. screen with a .28mm fine-dot-pitch CRT and horizontal scanning frequency of 31.5KHz.

Resolution is said to be up to

Your logical choice for printer & data sharing.

It's your choice.
Now you can give every PC user in your office *freedom of choice:* the choice to send their output to any printer — serial or parallel — anytime.
And all you need is *The Logical Connection*™ Version 3.0.

Instant switching.
Just "pop-up" the *memory resident* switching menu, cursor-point to the device you want to switch to, and press *ENTER.*
The Logical Connection handles all the print spooling, protocols and parallel/serial conversion automatically.

Preset configurations.
10 Preset configurations give multiple computers unlimited "switch and share" access to printers, plotters and modems — and each other.
Just cursor-point to a graphic "picture" of the configuration you want and download it with a couple of keystrokes, using any IBM-PC™ or compatible. If you need a *custom* configuration, you can easily modify one of the *presets* — or create your own.

Why network if you don't need to?
For peripheral sharing applications *The Logical Connection* can outperform a LAN, right out of the box — at a far lower cost.
The Logical Connection lets minicomputers and mainframes share peripherals with PCs. Or, let many devices share a single expensive modem connection.
And for really *big* applications, you can "daisy-chain" up to 45 *Logical Connection* boxes together, up to 3/4 of a mile apart.

PC MAGAZINE EDITORS' CHOICE
In April, 1987 *PC Magazine* named **The Logical Connection** "Editor's Choice among *all* printer sharing devices reviewed." Author Winn L. Rosch called it ". . . more than logical — maybe inspired!"

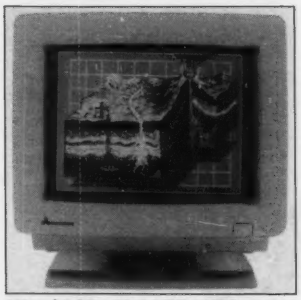
An easy choice.
The Logical Connection is easy to set up and easy to use. Best of all, it's easy on the pocketbook. For price performance and ease of use, nothing else even comes close.
So if you're looking for the *best* way to share your valuable computers and peripherals, there's only one logical choice. Get the logical connection today.
For the name of your nearest dealer, or to order direct, call *Fifth Generation Systems at* **1-800-225-2775.**

Fifth Generation
SYSTEMS, INC.
Innovative Products Using Today's Technology
11200 Industriplex Blvd., Baton Rouge, LA 70809
SALES:
2691 Richter Ave., Suite 107, Irvine, CA 92714
(800) 225-2775 • (714) 553-0111

*The Logical Connection is a trademark of Fifth Generation Systems, Inc. • IBM-PC is a trademark of International Business Machines, Inc.
*This product is in no way associated with or has originated in Fisher Scientific or Allied Corporation.

640 by 480 pixels with a vertical scanning frequency of 60 or 70Hz.

Other features include a red-green-blue analog video input signal, a precision



Mitsubishi's *Model XC-1492C*

in-line gun, a 120V, 60Hz power supply and an optional tilt-and-swivel base.

The XC-1492C is priced at $685.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502.

Board-level devices

A personal computer expansion card that is said to provide Datamaxx terminal emulations for Unisys Corp. mainframes has been announced by **Companion Products**, which is a division of Maxxima Corp.

The IBM Personal Computer-compatible **Termcard** contains a full Datamaxx EXT-1250 terminal emulation, including four display addresses plus a printer address, each of which makes for an independently configurable environment, the vendor said.

The product also features the capability to simultaneously communicate with two Unisys mainframes and compatibility with file-transfer software, according to the vendor.

Termcard costs $545.

Companion Products, P.O. Box 6477, 1815 S. Gadsden St., Tallahassee, Fla. 32301.

The **Multi Term Card**, a terminal-emulation board for the IBM Personal Computer and compatibles that is said to support full ASCII and ANSI terminal emulation as well as file transfer, has been announced by **Starsoft Technologies, Inc.**

The board allows users to perform bi-directional file transfer utilizing the Kermit and Xmodem protocols, according to the vendor.

Features are said to include dual-host communication in addition to split-screen functionality.

Software simulation packages available for the product include tools to emulate the Hewlett-Packard Co. 2392A and 2394, the Digital Equipment Corp. CT 52/100 and VT220 and the Wyse Technology, Inc. Wyse 50 in addition to the Televideo, Inc. 925 and 950.

The Multi Term Card is priced at $495.

Starsoft, 14884 Berry Way, San Jose, Calif. 95124.

An IBM 5251 emulation board, which was designed to connect IBM Personal System/2 Models 50 and 60 with IBM System/34, 36 and 38 minicomputers, has now been announced by **Ideassociates, Inc.**

The board, which is called the **Ideacomm 5251/MC**, offers terminal and printer emulation as well as windows with multiple sessions, according to the vendor.

It uses twinaxial cable to connect IBM Micro Channel-based personal computers to the minicomputer or to remote controllers.

The PCs have the ability to emulate IBM's 3180, 5251 Model 11, 5291 and 5292 Model 2 terminals and can be used with a color or monochrome monitor, the vendor said.

Features reportedly include support for 132-col. display and up to four concurrent host sessions in addition to printer emulation of IBM's 5224, 5225, 5226 and 5219.

The Ideacomm 5251/MC emulation board and software is priced at $895.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

A device said to add four expansion slots to an IBM Personal Computer has been announced by **Merak Industries.**

The **Addcard** makes available a total of eight slots inside the system unit.

Expansion cards that are connected to the Addcard have the ability to operate as a direct extension of the PC bus, according to the vendor.

The Addcard is priced at $79.

Merak, 8704 Edna St., Warren, Mich. 48093.

The **386Eagle**, an upgrade board for IBM Personal Computer ATs and compatibles, has been announced by **Applications Engineering and Associates, Inc.**

The 386Eagle allows full Intel Corp. 80386 software capabilities, according to the vendor.

The product features an 80386 CPU running at 16 MHz, an Intel 80384 clocking chip for timing control and 512K bytes of memory in addition to an 80-pin connector for an additional 2M bytes of expansion memory.

When installed, the board sidesaddles the disk controller instead of occupying a PC slot.

The 386Eagle costs $1,695.

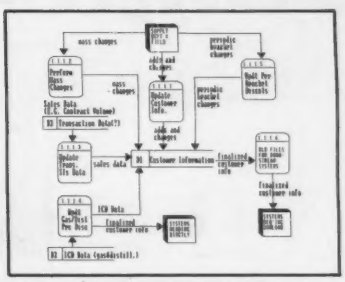
Applications Engineering, Suite 227, 3420 E. Shea Blvd., Phoenix, Ariz. 85028.

"CASE Package Breaks Price Barrier"

PC Week July 21, 1987

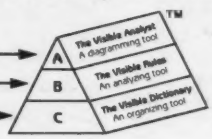
Find Out Why Major Companies are Refusing to Pay $10,000 and Up For PC-Based CASE Tools

Introducing - The Visible Analyst® Workbench

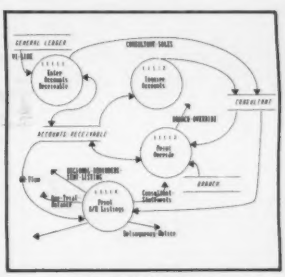


GANE AND SARSON DIAGRAM

Design Tool A $595
Design Tool B $595
Design Tool C $595



Quantities	Price per Tool
1- 4	$595.00 each
5- 9	$535.50
10- 19	$476.00
20- 34	$416.50
35- 49	$357.00
50-100	$327.25



YOURDON DIAGRAM

WORKBENCH FEATURES
VISIBLE ANALYST®
- MOUSE DRIVEN GRAPHICS
- CUSTOM SYMBOLS
- MANY LINE AND TEXT STYLES
- LINE RUBBERBANDING
- BLOCK MOVE
- CONSTRUCTS
- TREEFILE MANIPULATION
- PRESENTATION QUALITY OUTPUT
- UNLIMITED LEVELS OF DECOMPOSITION

VISIBLE RULES
- AUTOMATIC LEVEL-TO-LEVEL BALANCING
- DIAGRAM PROJECT VALIDATION - WITH YOURDON OR GANE & SARSON RULES
- CONSISTENCY CHECKING
- AUTOMATIC SYMBOL NUMBERING

VISIBLE DICTIONARY
- AUTOMATIC POPULATION FROM DIAGRAMS
- INTERACTIVE AND SEAMLESS
- DECOMPOSES YOUR DATA AS YOU DECOMPOSE YOUR PROCESSES
- IMPORT OR EXPORT DATA
- CUSTOM SYSTEM REPORTS
- ASCII DUMP UTILITIES WITH FILE FORMATS PROVIDED

SEE IT...Attend one of our FREE "Hands On" Workshops - See why major companies have chosen us! Call to register.

TRY IT...If unable to attend our workshops, then order a 30-day trial of the full Workbench (Tools A, B & C) for only $200 or just

BUY IT...and join our growing list of satisfied customers — many of whom are paying under $1000 per Workbench.

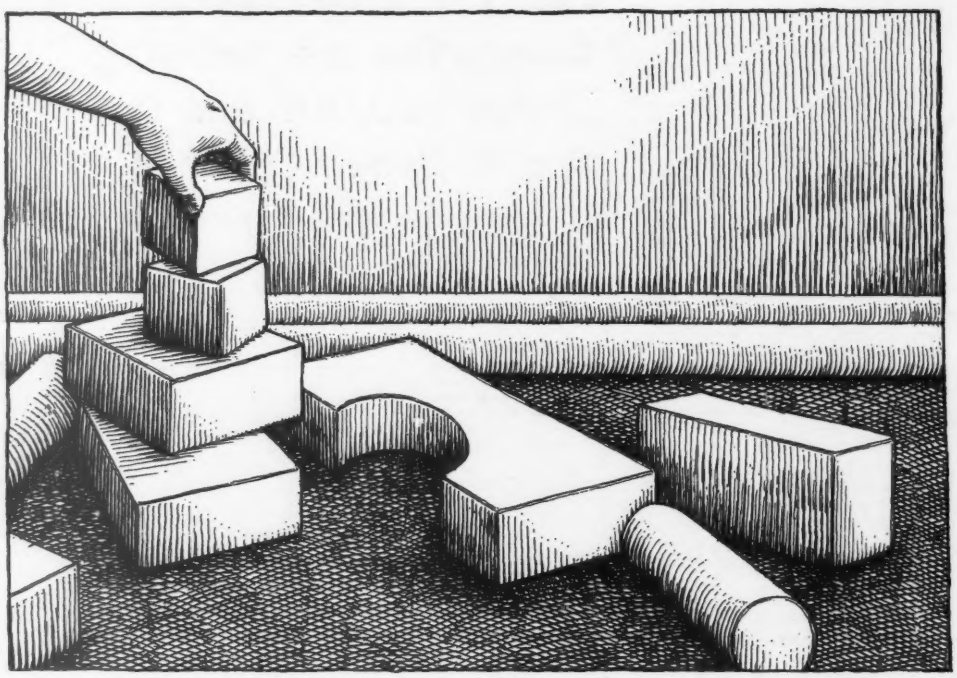
How Our Customers Got Started

We have all kinds of customers from small software consultant firms to Fortune 10 companies. Each customer has taken a different approach to acquiring our software. A number have started with Tool A, our diagramming module, then upgraded it to Tool AB and finally upgraded that package to Tool ABC or THE VISIBLE ANALYST WORKBENCH. Other customers have started with either Tool AB or Tool ABC. It is Visible Systems' objective to provide you, our customer, with flexible, modular and quality products. We offer no-nonsense common-sense prices, service, support and update/maintenance programs. Try us!

CALL 617-969-4100
Start Experiencing THE VISIBLE SOLUTION™ Today!!!!!

VISIBLE SYSTEMS CORPORATION
49 Lexington St., Newton, MA 02165

The way you buy our IBS service is based on a rather simple idea.



Namely, building blocks.

Because when you get IBS service through ITT Worldsat,℠ you can put together voice, data and video in virtually any combination—giving you an almost limitless range of options.

From electronic mail to video conferencing. From teleprinters and facsimile to packet switching.

So whether you want to process orders, transfer funds, or open your own "hoot'n'holler" line, Worldsat makes it easier, and more cost-efficient, than it ever has been before.

Worldsat

But the analogy doesn't end there. Because you can also lease Worldsat in digital "building blocks" of 64Kb increments—from 56/64Kbps all the way up to 2.048Mbps.

And this flexibility includes a full range of bandwidth, access and application choices, for all your international needs.

Now you can buy what you want, when you want it; add on what you need, when you need it.

Plus, we do all this with a guaranteed bit error rate of at least 1×10^{-6} And we manage your circuit for you—end to end.

To find out more, call us at 1-800-922-0184. Or write: Director, ITT Worldsat Marketing, 100 Plaza Drive, Secaucus, New Jersey 07096.

The idea behind Worldsat is simple. But then, the most advanced ideas usually are.

COMMUNICATIONS SERVICES VIA ITT

© 1987 ITT World Communications Inc.

DATA STREAM

Patricia Keefe

3Com, Bridge wedding set

Going to the Chapel. 3Com Corp., along with its intended, Bridge Communications, Inc., has moved quickly to avert any possibility of another humiliation at the altar. 3Com secured government approval to complete the proposed merger by the end of this month. The Securities and Exchange Commission has OK'd 3Com's registration statement covering the proposed issuance of 3Com common stock to Bridge shareholders under the merger. Both companies are seeking shareholder approval today. If all goes well, then maybe we can toss all the rice we've been saving for the occasion.

SAA what? If you're not exactly dying to hear the latest on IBM's Systems Application Architecture (SAA), you're not alone. "In most users minds, it's so big and complex that they don't know what it all means. In some cases, they are afraid to find out," says Thomas White, president of Infonetics, Inc. White noted that SAA is so far down the road and most users have more pressing matters to attend to. However, he says he's seeing a lot of interest in IBM's OS/2 Extended Edition. Although AT&T has promised to provide SAA-like capabilities, competitors don't need to offer complete SAA clones. SAA is the result of some unique problems faced by IBM in linking up its many disparate computer families, and not all vendors face the same issues.

Guessing games. Wouldn't it be interesting if Novell, Inc. decided it had to license OS/2 from Microsoft Corp. in order to provide OS/2 support on the server? This might be the case, unless Novell can figure it out on its own. Sources tell us that IBM is working with Novell to get around the lack of interrupts in OS/2 that aided Novell in supporting Microsoft's MS-DOS. Attendees at Novell's second annual Networld show, Oct. 20-22 in the Dallas Infomart, might glean more details

Continued on page 51

Wang takes Ethernet plunge

VS host links are first step on road to improved multivendor networking

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — Responding to user demand for multivendor connectivity, Wang Laboratories, Inc. last week announced an IEEE 802.3 Ethernet product platform that will eventually allow Wang VS hosts to communicate with a wide variety of systems.

The initial release only allows the VS to communicate with other VS systems through existing Wang Systems Networking (WSN) software. However, "this is only the first phase," said Kay Fairweather, Wang's manager of communications product marketing.

The next step for Wang will be to implement IBM Netbios-compatible software on the VS, turning it into an application, peripheral and file server for IBM Personal Computers on Ethernet, she said.

The next round of products, which Wang said it plans to announce sometime in 1988, will provide connections between the VS and other vendors' systems through the Transmission Control Protocol/Internet Protocol. Wang said it would eventually provide multivendor communications through the ISO Open Systems Interconnect standard but declined to say when.

Wangnet for all

Before the announcement, Wang allowed other vendors' products to communicate using 802.3 protocols on up to five subchannels of the broadband Wangnet local-area network (LAN), according to Robert Koch, Wang marketing manager for communications systems. "But you couldn't put any Wang systems on the 802.3 channels. Now you can put the entire VS family on Ethernet."

Wang's decision to implement 802.3 on the VS acknowledges growing support for 802.3 as an industry standard as well as user demand for cost-efficient connectivity between VS systems and other vendors' computers, Koch said.

A VS host equipped with Wang's 802.3 products can communicate over the Wangnet broadband network using 802.3 protocols. It also can communicate over an 802.3-compatible twisted-pair network via Wang subsidiary Intecom, Inc.'s IBX-Lanmark facility, Wang said.

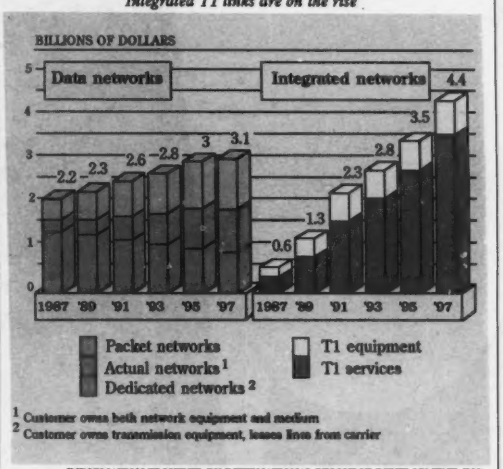
Wang's Ethernet hardware for the VS consists of the VS 802.3 LAN Controller, the VS 9-2/3 10M bit/sec. LAN Interface

Continued on page 53

Data View

Projected growth in private network installations

Integrated T1 links are on the rise



INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

3Com hopes beefed-up force reins in Novell

BY PATRICIA KEEFE
CW STAFF

With shareholders voting today on its pending merger with Bridge Communications, Inc. in Mountain View, Calif., 3Com Corp. is undoubtedly anxious to cement that relationship before Novell's runaway growth gets too far out in front.

Although 3Com President Bill Krause has been fond of predicting that the combined Bridge-3Com entity — boasting total sales of $185 million — will become one of the largest networking companies in the U.S., Novell's growth has been explosive following almost two years of acquisitions.

Novell was so hot that in *Business Week*'s annual look at the year's top 100 hot growth companies, based on results from the previous 12 months, it came in second, with a 361.3% increase in sales and a 49.2% return on capital. Conversely, 3Com placed 83rd, with a 69% increase in profits and a 16.3% return on capital.

Continued on page 53

Inside

- 3Com's Etherlink/MC connects PS/2s, Ethernet networks. Page 50.
- AMD chip set incorporates FDDI standard. Page 51.
- AT&T adds four units to Dataphone II modem line. Page 55.

Banyan uses 80386 engine to fire up file server

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Banyan Systems, Inc. last week announced plans to introduce in April, 1988 an Intel Corp. 80386-based file server and a 386 upgrade to its Motorola, Inc. 68000-based server.

Both products will run Banyan's distributed network operating system, Vines, and will support IBM's Micro Channel bus architecture, the vendor said. The high-end file server announcement will be followed by the next release of Vines, which is still on schedule, a spokeswoman said.

The Banyan/Corporate Network Server (CNS) is a pedestal-style server that reportedly will provide up to 24M bytes of memory with up to 32K bytes of memory cache for enhanced performance.

The upgrade package, called the BNS/386, will provide Banyan's 68000-based BNS server with the same 386 technology as the CNS server, Banyan said.

"Customers who purchase the BNS upgrade kit will be getting the same features, functionality and performance — at a comparable price — as customers who purchase a new [386-based CNS server]," Banyan President Dick Meise said.

Both products will feature a triple-bus architecture, including an IBM Personal Computer AT-compatible bus, a high-speed memory bus and a small computer systems interface peripheral bus.

Network support

The AT bus will support network adapter boards for any four of the many popular networks supported by Vines, including IBM's Token-Ring, Proteon, Inc.'s Pronet, 3Com Corp. and Micom-Interlan, Inc.'s Ethernet, Nestar Systems, Inc.'s Arcnet and others. Other features include support for a full 32-bit memory bus, file caching and an optional 32K bytes of high-speed, two-set associative memory cache.

The CNS will offer up to 1.2G bytes of internal storage and is equipped with a 150M-byte tape backup unit. The BNS/386 upgrade will support up to 628M bytes of internal storage. The BNS currently utilizes a 60M-byte tape unit but can be factory upgraded to support a 150M-byte tape drive, Banyan said. An additional 1.3G bytes of external storage will be available through

Continued on page 53

3Com adapter card links PS/2s, nets

Etherlink/MC lowers cost of connection to Ethernet

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. recently announced Etherlink/MC, an adapter card that it said connects IBM Micro Channel-based Personal System/2 computers to Ethernet networks.

Etherlink/MC reportedly features an on-board Ethernet transceiver and 3Com's Link Level Library capability. The transceiver lowers the cost of the connection by $200 to $300 and is more reliable and easier to install than adapters requiring an external transceiver and transceiver drop cable, 3Com spokesmen claimed.

The new adapter card also uses the Link Level Library, which is a well-defined software interface common to all 3Com adapters that make it easier for third-party software developers to port their products to Etherlink/MC.

The Micro Channel-compatible adapter, which is slated to ship in October for $595, reportedly allows all versions of 3Com's 3+ software to run on PS/2 machines in a 10M bit/sec. Ethernet environment. With the IBM Token-Ring adapter, 3+ can also run on PS/2 computers in a 4M bit/sec. Token-Ring environment, 3Com said.

Etherlink/MC is able to drive twice the cable segment distances of the IEEE 802.3 specification, reducing the need for repeaters in large Ethernet installations, 3Com said. It is also compatible with 3Com's recently announced products that allow direct connection of Ethernet networks to installed telephone wiring.

To improve system performance, Etherlink/MC uses a 16K-byte packet buffer and a shared-memory architecture. The buffer allows reception of back-to-back Ethernet packets, which reduces network traffic and retransmission of dropped packets, 3Com said. The shared memory increases the speed at which data is transferred from the network to the PS/2 system's memory.

Token-Ring goes to twisted pair

In a separate announcement, 3Com introduced a Type 3 Modular Access Unit (MAU) said to enable plug-in installation of a 4M bit/sec. Token-Ring network on unshielded twisted-pair wiring.

Using four RJ11 ports, the unit eliminates the need for jumper cables or other adaptions necessary to tie a Token-Ring network to the data-grade telephone wire (Type 3), 3Com said. Both IBM and 3Com Token-Ring adapters are supported. Individual units measure 5 by 3 by 6 in.

Four MAU units, providing 16 RJ11 connections, can be rack-mounted into a wiring closet. Network support for as many as 72 workstations is possible by daisy chaining the MAUs, according to 3Com.

The Type 3 MAU is available now for $395. A Type 3 power supply, required for each group of five units, costs $75.

Codex reveals net management strategy

BY PATRICIA KEEFE
CW STAFF

CANTON, Mass. — Officials at Codex Corp. recently took advantage of the firm's 9800 Series network management announcement to unveil a two-pronged strategy designed to take the company through the 1990s.

First, Codex said it will offer its customers a complete set of networking elements that embody state-of-the-art technologies.

"To that end, we are expanding on our product line to develop the broadest integrated line of communications products," Codex President John Lockitt said.

"We plan to become an industry leader in the digital marketplace, [offering] a complete family of digital, transmission, switching and concentration products," he added.

Example cited

Lockitt cited the Codex 6290 Integrated Digital Exchange, which was introdued earlier this year, as an example of this commitment.

The second leg of Codex's long-term strategy involves offering customers powerful integrated network management options that will give corporations both strategic and tactical control of the network.

"For years, our customers have been telling us that they want to control this strategic asset themselves," Lockitt explained.

In addition, Codex said that future releases — beyond 1988 — of the Codex 9800 Series will allow operator consoles to be networked together as well as allow for multiple management sites through the use of a peer-to-peer communications facility.

CA

A Technology This Big Simply Can't Be Contained on a PC.

Computer-Aided Software Engineering. More commonly known as CASE. It's a software technology whose time has come. With CASE, you can work faster and more efficiently in the design, analysis, implementation, and maintenance cycles of software development.

Clearly, a technology this big demands more than a PC. CASE belongs on a mainframe. Because only a mainframe can provide you with the capacity to undertake large development projects. And only a mainframe will allow you to easily share data among all developers, thereby unifying development efforts.

Unfortunately, almost all CASE products are PC-based. Until now.

Introducing CasePac: The First CASE Product Specifically Designed for the DB2 Environment.

By residing in the DB2 environment, CasePac provides you with the processing power, distributed development features, and data sharing capabilities that you just can't find with PC-based CASE products.

With CasePac, all your developers build upon one set of dev lopment data, and work with one

Wedding set

CONTINUED FROM PAGE 49

by attending a panel discussion on OS/2 and communications to be held on Wednesday, Oct. 21. Panel members will include representatives from Novell, IBM and Microsoft.

Key network support. Codex Corp.'s network management announcement two weeks ago highlighted two trends — a move among vendors currently embracing Transmission Control Protocol/Internet Protocol toward the ISO Open System Interconnect (OSI) model; and secondary support for IBM's Netview, much as any other third-party network management product will be supported.

Describing de facto standards as ultimately limiting, Codex said it will nonetheless provide support for IBM's Netview via its 4800 network management system later this year and through its 9800 Series "in the near future." Realizing that Netview and IBM's Netview/PC will be used by customers in IBM Systems Network Architecture environments, Codex said it plans to provide Netview/PC support by the second quarter of 1988, according to Jeremy Frank, program director for the Gartner Group, Inc.'s Enterprise Network Strategies in Stamford, Conn.

"Most of the customers we've talked to are not convinced that Netview will deliver the functionality for real-time network management and control until the 1990s, and they are looking for a system that will coexist next to their Netview console," Frank said. Codex's assumption that the 9800 Series will support other vendors' equipment because those vendors will support the ISO's OSI model has merit.

Anyone taking notes? As activity heats up in the network management arena and the vaporware announcements begin to pile up, vendors hard at work piecing together their strategy might want to take note of the following comments. Overheard from a frustrated user at a recent trade show: "You shouldn't have to have a Ph.D. on your staff to manage a network." And from a user forum on networking: "Most vendors today do a lousy to mediocre job at network management."

Gates speaks. Microsoft Corp. Chairman Bill Gates stopped off from his marathon publicity campaign to keynote PC Expo last month. Kernels gleaned from Gates' hour-long talk included a prediction that OS/2 will, of course, play a central role in many corporations' networking strategies. The typical networking system will run OS/2, no doubt with the LAN Manager, multiple Intel Corp. 80386 chips and be capable of supporting hundreds of micro systems, he said.

Keefe is a *Computerworld* senior editor, networking.

SE

CASE tool. No matter how large the project. No matter how distributed the development efforts.

CasePac. A Comprehensive CASE Facility Combined with an Integrated DB2 Data Dictionary.

The CasePac data dictionary acts as a central repository for all your development information, from design through maintenance. No matter how large your project, the power of the CasePac data dictionary enables all your developers to work with, and build upon, the same set of integrated lifecycle information. So the software objectives you initially establish are maintained throughout the development process.

Extensive Graphics, Modeling, and Analysis Capabilities. And More.

The graphics, data modeling, analysis, extensibility, DB2 design, and maintenance features of CasePac make it a valuable tool for all cycles of software development.

What's more, CasePac provides comprehensive data base administrative functions such as defining DB2, IMS, and flat file structures.

And with CasePac, you gain immediate access to both on-line and hard copy documentation, which is generated automatically.

Up and Running Immediately. Free 30-Day Trial.

You'll benefit from CasePac's capabilities right away, because CasePac reads COBOL programs and libraries, IMS libraries, and the DB2 catalog to populate the dictionary from existing applications.

For a free, 30-day trial of this remarkable product, call or write: On-Line Software International, Inc. Two Executive Drive, Fort Lee, NJ 07024. OEM, VAR and Service Bureau programs are also available. Look for CasePac product seminars offered in your area—call for dates and locations.

So if you're serious about using CASE technology in your software development process, use the first CASE product that has the mainframe power and capacity you need. CasePac.

800·642·0177

In Canada: 416·671·2272/In Europe: 44·1·631·3696

On-Line Software International

Authorities in IBM® Software

CasePac. Automated Software Development and Integrated Data Dictionary for DB2.

IBM and DB2 are registered trademarks of International Business Machines.

TCS CasePac is a joint venture with Tata Consultancy Services.

AMD promotes LAN standard

SUNNYVALE, Calif. — Hoping to pave the way for widespread implementation of local-area networks (LAN) based on ANSI's Fiber Distributed Data Interface (FDDI) standard, Advanced Micro Devices, Inc. (AMD) is expected to introduce today what it claimed is the first chip set to incorporate the new standard.

FDDI uses fiber-optic media to reportedly outperform Ethernet and other LANs by a wide margin.

AMD said it had squeezed the complete capabilities of a six-board FDDI node into the five-chip Supernet set, resulting in a cost reduction of approximately 80%. According to AMD, this cost reduction makes FDDI commercially viable for the first time.

Networks based on FDDI are said to operate at 100M bit/sec. — 10 times the rate of IEEE 802.3-standard Ethernet. The fiber-optic cabling reportedly supports a maximum LAN circumference of 100 km — approximately 35 times that of Ethernet.

Not a replacement

But because of Ethernet's large base and relatively low cost, AMD said it does not expect FDDI to displace Ethernet in the near future.

"The thing that will initially keep FDDI from killing [Ethernet] is the cost of the optical data links," said Tom Slykhouse, strategic development manager for high-speed networking. "That's a significant part of the node cost."

Currently, an FDDI implementation would cost roughly five to 10 times that of a comparable Ethernet implementation, Slykhouse said.

Other benefits of FDDI include a form of fault tolerance and a timed-token protocol that guarantees network access within a specified time, AMD said.

FDDI can be implemented with two counter-rotating rings, doubling data throughput to 200M bit/sec. while having the ability to automatically reconfigure to one good ring in the event of a failure.

The Supernet chip set consists of a random-accesss memory buffer controller, a data path controller, a fiber-optic ring media-access controller, a receiver and a transmitter. AMD said it will make the chip set available in volume by the first half of 1988. In quantities of 100, the price is $625.

BIT BLAST

Harris division opens system to support token ring

Joining the recent rush to introduce token-ring products, the Dallas-based **Data Communications Division of Harris Corp.** opened up its proprietary 9300 network communications system to provide support for the token ring.

Harris unveiled a token-ring adapter card and enhancements to its Harrisnet network operating system designed to enable users to use the token ring as a backbone network linking multiple 9300s.

The 9300 token-ring network adapter is said to be IEEE 802.5-compatible, to transfer data at 4M bit/sec. and cost $1,295. It is scheduled to ship next month.

Communications between 9300 and non-9300 devices are not supported. Future releases will provide connectivity between personal comptuers and the 9300 using the token-ring architecture, according to the vendor.

The Association for the Advancement of Communications Technology will hold an open membership meeting on Wed., Sept. 30, from 6:30 to 9:30 p.m. at the State University of New York College of Technology at Farmingdale in the Roosevelt Hall Loft Lounge.

The campus is located off Rt. 110 on Melville Road. There will be a $5 fee to cover the cost of refreshments. The meeting is sponsored by Northern Telecom, Inc. and will focus on that vendor's SL-1, SL-1 Meridian and DVI product lines.

Digital Equipment Corp. VAX/VMS and MicroVMS systems will be able to communicate over **Proteon, Inc.** networks using Transmission Control Protocol/Internet Protocol (TCP/IP), the Westboro, Mass.-based local-area network (LAN) vendor recently announced.

Through a reseller agreement, Proteon will install the Wollongong Group, Inc.'s WIN/TCP software on its VAX and Microvax controllers for the 10M bit/sec. Pronet-10 and 80M bit/sec. Pronet-80 token-ring LANs.

Proteon already offers TCP/IP on network interfaces for IBM VM/CMS systems and Personal Computers; VAX systems running Unix; Sun Microsystems, Inc. workstations; and the Proteon Terminal Interface Unit.

IBM Personal System/2s on an Ungermann-Bass, Inc. Ethernet network will be able to access DEC hosts via micro-to-mainframe software from **Datability Software Systems, Inc.** Based in New York, Datability has ported its Remote Access Facility (RAF) to Ungermann-Bass's NIC PS/2.

Datability's RAF is said to allow microcomputers to emulate DEC VT100 and VT220 terminals and to execute programs and access files on DEC hosts. The program is priced at $395 per PS/2 or host user.

Apollo Computer, Inc. in Chelmsford, Mass., and **Ridge Computers** in Santa Clara, Calif., announced that they will jointly develop and market products that integrate Apollo workstations and Ridge reduced instruction set computing-based superminicomputers via Apollo's Network Computing System (NCS).

NCS allows applications to be distributed across multiple computing resources.

Dialcom, Inc. in Rockville, Md., and **DEC** have agreed to jointly test interoperability of their CCITT X.400 products. If the tests are successful, DEC systems running X.400-compatible All-In-1 software will be able to exchange mail with Dialcom's X.400-compliant electronic messaging service, the companies said.

In a separate announcement, **Southern New England Telecommunications** recently claimed to be the first local telephone company to offer statewide local access to Dialcom's electronic mail and information services. The independent phone company, based in Connecticut, will provide access to Dialcom services via its packet-switched offering, Connnet.

DEC and **Pacific Bell** recently announced that they have signed a contract for joint development of a CCITT X.400 internal messaging system, linking Pacific Bell's internal mail systems to DEC's Mailbus electronic messaging system. Pacific Bell's message handling system will be compliant with the X.400 series of protocols that support the ISO's Open Systems Interconnect model. The telephone company says it plans to use Mailbus to link its system to those of various vendors.

Users of two network operating systems from **Corvus Systems, Inc.** in San Jose, Calif. — Constellation and the distributed PC-NOS — can now connect those two systems using The Constellation-PC-NOS Connection from Corvus. The package reportedly enables the two operating systems to run in combination on Corvus's Omninet network. This provides users of Omnidrive servers with an upgrade path to PC-NOS file-service capabilities, as well as connectivity to Microsoft Corp.'s MS-DOS, and Apple Computer, Inc.'s Macintosh, Apple II and Laserwriter environments, Corvus said. It also provides a method for MS-DOS users on PC-NOS networks to add Apple II or Macintosh computers to their networks.

The Constellation-PC-NOS Connection is licensed for an entire Omninet network of 64 users and costs $50. For a limited time, Coruvs said it will offer the connection software free when ordered with PC-NOS.

Our LAN-Gateway runs 56Kb.

At 56Kb, RabbitGATE™ is the fastest 3270 and RJE remote host connection for NETBIOS LANs around. Which, in itself, is something you may not require. But isn't it nice to know you'll be able to run that fast when your needs change? And more important, it's good to know RabbitGATE outperforms the competition no matter how fast—or slow—you drive it, in either BSC or SNA.

For starters, RabbitGATE has its own onboard dedicated 80186 processor and 512k of RAM. Which is why its high speed is not limited by the PC. It also means the only gateway function required on the PC is for actual access to the LAN. So when compared to other gateway products, which downgrade your workstation into a dedicated controller, RabbitGATE can save up to 50% of your workstation's processor and RAM.

You'll also find RabbitGATE easy to use. Installation and configuration takes less than 30 minutes. As opposed to hours for the competition. In fact, initial installation and start-up is so easy, most people don't ever open the user guide.

And speaking of users, RabbitGATE allows any end-user to individually customize the keyboard—doing so simply, without technical support. Then, only one DOS command is used to run the product. And, by the way, help for first-time or infrequent

3Com, Novell

FROM PAGE 49

Novell also managed to place within the top five in two of six performance categories highlighted by *Businessweek*: sales growth (fifth, at a 180% average annual rate) and market value (fifth, at $517 million).

Moreover, in the last four quarters, Novell has kept up the pace, with growth far outstripping Santa Clara, Calif.-based 3Com. A number of analysts attribute this to Novell's Netware network operating system becoming increasingly entrenched as the de facto standard.

Douglas Whitman, a senior analyst with Alex Brown & Sons, Inc. in San Francisco, estimated that Novell's revenue is 50% software vs. 10% for 3Com. Moreover, a recent study of the Fortune 1,000 by Forrester Research, Inc. in Cambridge, Mass., revealed that 50% out of a sample of 40 Fortune 1,000 users used Netware vs. 10% for both 3Com's 3+ network software and Banyan Systems, Inc.'s Vines (see chart page 49). Whitman estimated that Netware is outselling 3+ six to one.

Even in the server market, Forrester's sampler found Novell with 33% of the users and 3Com with a mere 3%, trailing Banyan, Houston-based Compaq Computer Corp.'s Deskpro 386 and generic minicomputers used as departmental file servers.

Recent growth spurt

Novell has grown 49.8% from October 1986 to July 1987, according to Whitman. Novell's earnings per share were 16 cents in October 1986, jumping to 20 cents in its most recent quarterly results, a 25% growth rate. Meanwhile, 3Com paid out 20 cents in October 1986 and 22 cents in its last quarter.

Whitman broke down 3Com's quarterly revenue as follows: $28.3 million in November 1986, not including graphics and diskless PCs; $30.4 million in February; $31.6 million in May; and $33 million in August. "In three quarters, 3Com has grown 16%," he said. Novell, meanwhile, posted revenue of $32.5 million in October 1986, $34.5 million in January, $42.4 million in April and $48.7 million in July.

Because 3Com and Novell, once arch rivals, are diversifying so much, it is becoming harder to compare apples to apples when looking at the two companies.

Even though Novell has snapped up a number of companies, including micro-to-mainframe vendor CXI, Inc., database software vendor Softcraft, Inc. in Austin, Texas, and hardware manufacturer Santa Clara Systems, Inc., the basis of its business remains the Netware operating system, followed by CXI, Whitman said.

Revenue booster

"Netware has increased its percent of overall revenue in the last quarter, but Novell grew their revenue $6.3 million while 3Com expects to grow only $1.4 million. 3Com's revenue on a sequential basis grew 4.7%," Whitman said.

However, Whitman said 3Com is doing well. He agreed the Bridge merger may significantly boost 3Com's fortunes, because Bridge's management team will add a lot of dimension to 3Com, as will the ability to sell through direct sales.

"Bridge's products give 3Com the necessary edge to sell to large corporations," said Eric Killorin, publisher of Andover, Mass.-based Hyatt Research Corp.'s "Netline" newsletter.

How helpful direct sales will be depends on whether 3Com can devise a program that will keep its traditional distribution channel dealers and value-added resellers happy. "I think a lot of dealers are concerned that Bridge's direct sales force will be gunning for them now," Whitman said. However, Bridge may beef up dealer sales by pumping some of its equipment through that channel.

"3Com has been hurt by not selling its driver and board to Novell. I wouldn't be surprised to see that change," Whitman predicted. He added that he believes 3Com's recent decision to sell fault-tolerance products will be a big plus.

Banyan

FROM PAGE 49

use of Banyan's BNX expansion chassis.

Both products provide seven bus slots, which can be used for memory, network adapter cards or communications boards. Up to 30 serial ports are available and can support CCITT X.25, IBM's Systems Network Architecture, High-Level Data Link Control, bisynchronous or asynchronous communications. Also, up to four serial and three parallel printers can be connected directly to the servers.

The CNS base configuration will include 4M bytes of memory, 80M bytes of storage, a 150M-byte tape drive, an internal battery backup, Vines, software to support one network and documentation. List price will be $21,995.

The base upgrade kit includes a 386-based CPU board, 4M bytes of memory, a backplane, upgrade software tape and documentation. Banyan said it will be priced at $6,125.

Wang

FROM PAGE 49

and VS 802.3 Cable Kits. Wang offers "soup-to-nuts" installation and maintenance of an 802.3 LAN, according to Koch.

The controller is priced at $2,500, the interface at $1,500 and the kits from $100 to $300.

The 802.3 software consists of WSN VS Netcore Release 8.31 and VS WSN 802.3 Transport. The WSN software can communicate with other WSN systems via other network transport protocols, including CCITT X.25 and X.21 and WSN point-to-point. The 802.3 Transport software implements OSI layers 1 to 3 and costs $750.

But speed isn't everything.

users is always just a single keystroke away.

As if saving you time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers unique features like a built-in windowing capability, 8 host sessions per workstation, and true concurrent operation of all active sessions. It even allows you to simultaneously talk to different hosts with different protocols from anywhere on the LAN.

So, speed may not be everything. But RabbitGATE can mean everything to your LAN. Is it any wonder companies like CSX, Aetna, and Citicorp depend on us for their connectivity needs? Or that OEMs like NEC and IBM work with us to develop connectivity solutions to their specifications? For a product evaluation, or for more information on all our products—including COAX, X.25, LU6.2, and 5250—call 1-800-RABBITC.

Rabbit
SOFTWARE
We've got them all talking

NEW PRODUCTS

Local-area network hardware

A local intelligent network controller called **CY233-Linc** has been introduced by **Cybernetic Micro Systems, Inc.**

The controller is said to offer data-transfer rates of up to 38.4K bit/sec. It is a 40-pin, 5V CMOS device that interfaces serial communications to parallel TTL circuits. By using up to 255 CY233 devices, one computer can control or monitor 2,048 TTL signal lines.

Features include support for a token-passing protocol.

The CY233-Linc has a single-quantity price of $75.

Cybernetic, P.O. Box 3000, San Gregorio, Calif. 94074.

Teltone Corp. has added **Tellan/PC** to its Tellan data-over-voice local-area network (LAN).

Tellan incorporates data switching and personal computer LAN functions into modular units that transmit simultaneous voice and data on existing telephone lines. Intelligent network interface units interconnect terminals, PCs, minicomputers and mainframes.

Tellan/PC is a plug-in card that fits into an expansion slot and provides full PC LAN functionality, including PC-to-PC file transfers and access to file servers. Users can run Netbios-compatible PC network operating systems.

The Tellan network costs about $324 per port. The Tellan/PC card costs $595.

Teltone, 10801 120th Ave. N.E., Kirkland, Wash. 98033.

Customer-premise equipment

A personal computer-based voice mail system designed for use in offices with up to 75 people has been announced by **Votan.**

Called the **Telecenter Entry System,** the two-port, four-hour messaging system features the vendor's voice-recognition technology, which enables users to control the system with either voice commands or Touch-Tone signals.

The Entry System acts as a centralized message center, recording, playing back and distributing personalized messages for all callers. It can function as a stand-alone or as part of a private branch exchange.

The system consists of a dedicated personal computer, two Votan voice cards and software. Voice storage is provided by a 20M-byte hard disk drive. It costs $7,950.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

A control system called **Controlnet 250** has been announced by **Data Switch Corp.** for use with its DSM series of distributed data communications matrix switches.

The system is said to allow up to 37 gateways, each of which can support a user terminal, an audit-trail printer or up to eight switching systems. It utilizes an Intel Corp. 80386-based multibus architecture with 2M bytes of random-access memory, a 40M-byte hard disk, a 360K-byte floppy and a 60M-byte streaming cartridge tape.

According to the vendor, the product provides multiple levels of password security.

Controlnet is available in four models that support from five to 37 gateway ports. Prices range from $10,000 to $42,000.

Data Switch, One Enterprise Drive, Shelton, Conn. 06484.

Links

A memory-resident communications environment for IBM Personal Computers and compatibles has been announced by **Architectural Communications, Inc.**

The software, called **Hotkey,** allows users of a word processor, spreadsheet or data base applications to switch into Hotkey with a keystroke and establish a remote connection to a minicomputer, modem or data private branch exchange. When the user returns to the foreground application, Hotkey operates in the background, rerouting data.

Hotkey offers five protocols for file transfer, including ASCII, Xmodem/Checksum, Xmodem/CRC, Tmodem/Checksum and Ymodem/CRC.

Hotkey is priced at $69.

Architectural Communications, 1800 W. Park Drive, Westboro, Mass. 01581.

A menu-driven system said to provide IBM Systems Network Architecture (SNA) 3270 terminals with access to X.25 networks and ASCII hosts has been announced by **Simware, Inc.**

Sim/Dialout suports direct communications from SNA networks to external on-line information services. It is a VTAM application program that allows users to capture in an MVS data set all or part of the information displayed in an external application. Users may also store outgoing information in an OS data set before connecting.

Sim/Dialout is priced at $10,000.

Simware, 20 Colonnade Road, Ottawa, Ontario, Canada K2E 7M6.

Outbound, a software link designed for IBM MVS users needing to transfer files to unattended personal computers, has

been announced by **Firesign Computer Co.**

Outbound sends commands over an IBM Systems Network Architecture (SNA) network to a microcomputer with a standard IBM 3270 emulation card. PC-resident Outbound software decodes the command and reads or writes the specified file. A perpetual license for one MVS host and an unlimited number of PCs costs $24,000.

Firesign, 480 Green St., San Francisco, Calif. 94133.

Protocol converters

A bidirectional converter designed to change RS-232 data streams into RS-422-compatible data streams has been introduced by **Anaheim Automation.**

The **Model AA1709** uses a female DB255 connector for the RS-232 interface and a female DB-9S connector for the RS-422 interface.

It supports the Request to Send and Clear to Send handshake lines and uses balanced differential signals that permit communications on cable lengths to 4,000 ft..

The converter is priced at $89 in quantities of one to three.

Anaheim Automation, 910 E. Orangefair Lane, Anaheim, Calif. 92801.

File servers

Two fault-tolerant file servers have been announced by **Pajac Systems, Inc.**

The **Faultnot 286** and the **Faultnot 386** are part of Pajacs' family of Supersonic local-area network hardware products, designed, the vendor said, so that no single fault can result in a total network outage. Each Faultnot processor is linked together on a 16M bit/sec. bus, and up to 33 Faultnot systems can be interconnected.

The Faultnot 286 and 386 cost $25,000 and $35,000, respectively.

Pajac, 1 Militia Drive, Lexington, Mass. 02173.

A network file server designed for use with NEC 1500 Advanced Workstations in an Ethernet environment has been announced by **NEC Information Systems, Inc.**

The server, called the **NEC 1900,** uses the Ethernet local-area network to allow workstations to share mass-disk storage and peripheral devices. Based on the Motorola, Inc. MC68020, standard features include a 32-bit system bus, 4M bytes of main memory, a paged memory management unit and a floating-point math coprocessor.

Other features include a magentic tape cabinet, a 9-in. 395M-byte Winchester disk drive, three RS-232C serial ports and a 1.2M-byte 5¼-in. floppy disk drive.

The NEC 1900 Network File Server is priced from $54,000.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Modems/Multiplexers

AT&T has added four units to its **Dataphone II** modem line.

The Dataphone II 2192A model, capable of full-duplex synchronous data transmission over private line channels at up to 19.2K bit/sec., includes an integrated, six-port time-division multiplexer for testing any one of its ports without affecting service on the other five.

The Dataphone II 2296A, designed to transmit large volumes of information at one time, operates in full-duplex, synchronous or asynchronous mode over standard telephone lines at 4.8K bit/sec. and 9.6K bit/sec.

Both the stand-alone 2224CEO and the rack-mountable 2224G modems provide full-duplex communications over switched networks. Both units operate synchronously at 300, 1,200 and 2,400 bit/sec. and asynchronously at 2,400 bit/sec.

The 2192A costs $9,500. The 2296A costs from $2,500 to $3,100, while the 2224CEO is priced at $695. The price of the 2224G is $650.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

An automatic dialer designed for use with IBM 3270-type terminal systems has been introduced by **Tuck Electronics, Inc.**

The **Model 1990 Auto-Dialer** is said to read telephone numbers from 3278-type screens and automatically dial the number. It is completely passive, the vendor said, and any system using the Model 1990 remains completely interactive. No tape, disk or batch work is involved, and no software or hardware modifications are required.

The Model 1990 is priced from $1,250.

Tuck Electronics, 330 Second St., New Cumberland, Pa. 17070.

A 2,400 bit/sec. stand-alone modem has been introduced by **Practical Peripherals.**

The **Practical Modem 2400 SA** is Hayes Microcomputer Products, Inc.-compatible and can store up to 10 telephone numbers for automatic dialing. Other features include automatic-answer mode selection; number of rings to answer on; speaker volume; communications rate; and guard-tone selection.

Dial features include Touch-Tone or pulse and programmable pulse interval.

The modem has separate telephone line and telephone set connectors and connects with modular jacks.

The 2400 SA costs $239.

Practical Peripherals, 31245 La Baya Drive, Westlake Village, Calif., 91362.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2966, Morristown, N.J. 07960-1278.

© 1987 AT&T

AT&T
The right choice.

A 14.4K bit/sec. full-duplex leased-line modem has been introduced by **Emulex Corp.**

The **Performance 1000/14.4** provides menu-driven operation through a 16-char. LCD. The remote Performance 1000 may also be configured and tested through the local modem's front panel without operator intervention at the far end.

The Performance 1000/14.4 costs $1,795.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

An intelligent networking T1 multiplexer said to support 508 voice-and-data ports per node has been introduced by **Paradyne Corp.**

The **3230 T1 nodal processor** supports up to six 2.048M bit/sec. aggregates for international users. Trunk aggregates may run at speeds from 48K to 2.048M bit/sec. in 8K bit/sec. increments. Voice is supported using Pulse Coded Modulation at 64K bit/sec. or Adaptive Differential Modulation at 32K or 24K bit/sec. encoding methods.

Multiple tasks may be distributed in a load-sharing fashion among multiple nodes. Features include automatic alternate routing, dynamic bandwidth allocation and priority bumping.

A starting configuration, consisting of a single chassis package with 20 voice-and-data ports, costs about $30,000.

Paradyne, P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla., 33540.

A modem designed for the Toshiba Corp. T1100 Plus and T3100 Portable Personal Computers has been unveiled by **Multi-Tech Systems, Inc.**

The **Multimodem212TL** operates at 1,200 and 300 bit/sec. and is compatible with the Bell 212A and Hayes Microcomputer Products, Inc. AT standards.

The plug-in card fits in the Toshiba expansion slot, providing dial-up communications for either model computer.

The modem operates in both half- and full-duplex asynchronous modes and provides automatic dialing and answering capability using both tone and pulse dialing, the vendor said.

The modem costs $299.

Multi-Tech, 82 Second Ave. S.E., New Brighton, Minn. 55112.

A 1,200 or 300 bit/sec. modem that uses the Microcom Networking Protocol error-detection and correction protocol for transmitting data over normal communications lines has been announced by **Multi-Tech Systems, Inc.**

The **Multimodem212E** desktop modem operates in synchronous or asynchronous modes and can be set to run in autodetect, with or without the MNP protocol.

According to the vendor, the modem has the ability to operate at a fixed speed of up to 9.6K bit/sec. via its RS-232C serial while at the same tine communicating at either 300 ro 1200 bit./sec. over the phone lines.

The Multimodem212E is priced at $399.

Multi-Tech, 82 Second Ave. S.E., New Brighton, Minn. 55112.

A 2,400 bit/sec. modem built on a short card to fit inside any IBM Personal Computer or compatible has been announced by **Franklin Telecommunications.**

The **FM2400I** is fully Hayes Microcomputer Products, Inc. AT command set-compatible and operates with Microcom Networking Protocol Level 4 at each speed. It operates in full-duplex mode and supports Bell 212A, Bell 103A, CCITT V.22 and CCITT V.22. The modem comes with Softklone Distributing Corp.'s Mirror II communications software.

Features include call-progress monitoring, automatic voice-to-data switching without redialing and the ability to inform other accessible lines that the particular line is in use.

The FM2400I costs $399.

Franklin Telecommunications, 733 Lakefield Road, Westlake Village, Calif. 91361.

A family of **modems** featuring speeds ranging from 9.6K to 19.2K bit/sec., designed for use over leased lines, has been announced by **Telenetics Corp.**

The models operate synchronously at 9.6K bit/sec., 9.6K bit/sec. with a Fast Poll capability, 14.4K bit/sec. and 19.2K bit/sec. over 4-wire leased lines.

Features include automatic adaptive equalization and fixed-line and compromise equalizers.

The modems are available as stand-alones or in rack-mount versions. Pricing for the stand-alone versions ranges from $1,495 to $5,995.

Telenetics, 895 E. Yorba Linda Blvd., Placentia, Calif. 92670.

An internal modem server said to allow a personal computer to use up to 16 modems has been announced by **Omnitel, Inc.**

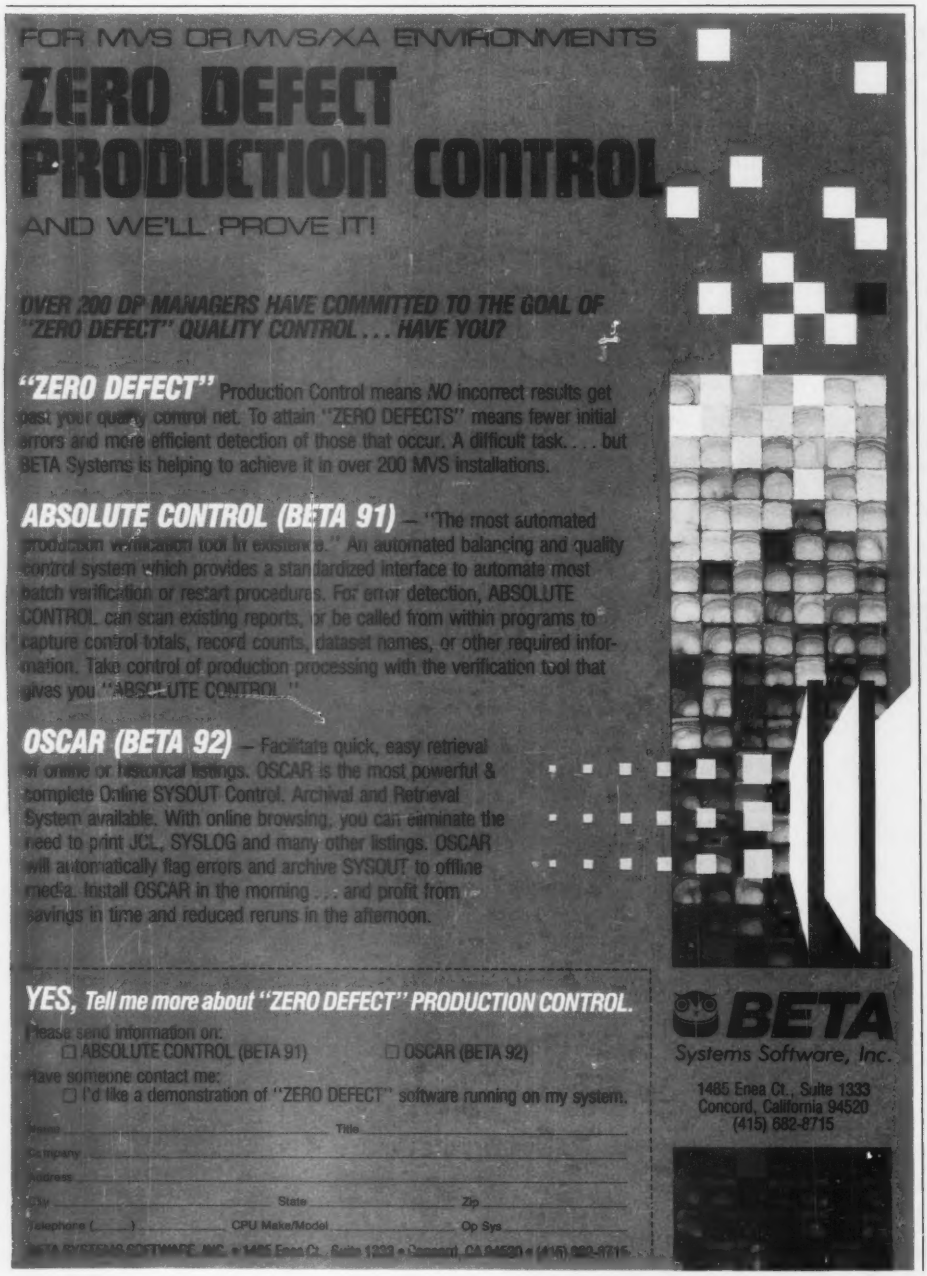
The **Netcomm series** consists of the hardware and software that is needed to convert an IBM Personal Computer XT or PC AT into an integrated modem server.

The series includes a half-size asynchronous card called the Netcomm V-Com; Netcomm Asynchronous Communication Server (ACS) Netbios-compatible software; and Q1200 and Q2400 internal modem cards providing access to four to 16 internal modems, according to the vendor.

The V-Com costs $179. The ACS Software costs $995.

The Q1200 costs $895, and the Q2400 costs $1,799.

Omnitel, 5415 Randall Place, Fremont, Calif. 94538.


FOR MVS OR MVS/XA ENVIRONMENTS
ZERO DEFECT PRODUCTION CONTROL
AND WE'LL PROVE IT!
OVER 200 DP MANAGERS HAVE COMMITTED TO THE GOAL OF "ZERO DEFECT" QUALITY CONTROL . . . HAVE YOU?
"ZERO DEFECT" Production Control means NO incorrect results get past your quality control net. To attain "ZERO DEFECTS" means fewer initial errors and more efficient detection of those that occur. A difficult task. . . but BETA Systems is helping to achieve it in over 200 MVS installations.
ABSOLUTE CONTROL (BETA 91) – "The most automated production verification tool in existence." An automated balancing and quality control system which provides a standardized interface to automate most batch verification or restart procedures. For error detection, ABSOLUTE CONTROL can scan existing reports, or be called from within programs to capture control totals, record counts, dataset names, or other required information. Take control of production processing with the verification tool that gives you "ABSOLUTE CONTROL."
OSCAR (BETA 92) – Facilitate quick, easy retrieval of online or historical listings. OSCAR is the most powerful & complete Online SYSOUT Control, Archival and Retrieval System available. With online browsing, you can eliminate the need to print JCL, SYSLOG and many other listings. OSCAR will automatically flag errors and archive SYSOUT to offline media. Install OSCAR in the morning . . . and profit from savings in time and reduced reruns in the afternoon.
YES, Tell me more about "ZERO DEFECT" PRODUCTION CONTROL.
Please send information on:
☐ ABSOLUTE CONTROL (BETA 91) ☐ OSCAR (BETA 92)
Have someone contact me:
☐ I'd like a demonstration of "ZERO DEFECT" software running on my system.
Name Title
Company
Address
City State Zip
Telephone ( ) CPU Make/Model Op Sys
BETA SYSTEMS SOFTWARE, INC. • 1485 Enea Ct., Suite 1333 • Concord, CA 94520 • (415) 682-8715
BETA
Systems Software, Inc.
1485 Enea Ct., Suite 1333
Concord, California 94520
(415) 682-8715

SYSTEMS & PERIPHERALS

HARD TALK

Jean S. Bozman

Performance: Prove it!

"I'm mad as hell, and I'm not going to take it anymore." That was the credo of the anchorman in the movie *Network*. It seems that the relentless stream of news had caused him to state the obvious about the difficulty of coping with adversity.

The same feelings about adversity may be said to plague those who procure computer systems. They have, for years, tried to figure out how the systems proffered by sales representatives were going to perform once they were uncrated on a raised floor. But there was often no way to compare different systems, each of which ran vendor-specific software. If users were mad, there was no way to vent their frustration.

Recently, some cracks seem to have developed in the protective shells vendors have built around their systems. Unix, the Manufacturing Automation Protocol, Technical and Office Protocol and Open Systems Interconnect are all examples of unifying structures that can be imposed on a variety of computer systems. Now MIS directors have found a way to compare Apples with Apples, or with

Continued on page 60

Unisys adds 1100/90 models

Product line offers more memory, lower prices, less in maintenance costs

BY STANLEY GIBSON
CW STAFF

BLUE BELL, Pa. — Without fanfare, Unisys Corp. recently replaced portions of its former Sperry Corp. 1100 line with models that offer price reductions of up to 26%.

Called the 1100/90 Model IIs, the machines offer the same performance as the previous models but are priced lower because of the use of 256K-bit memory chips, according to the vendor. The earlier models used 64K-bit chips. An entry-level 1100/90 comes with 32M bytes of memory, compared with 8M bytes in the previous models.

In addition, Unisys unbundled the operating system and cut maintenance prices on the Model IIs by 30%. The maintenance price cuts were offered without any customer requirement to do additional problem and change tracking, as is required under IBM's Corporate Service Amendment plan. The maintenance cuts were offered only on the new machines because of the memory and technology improvements and the new software version, according to Joel Brody, Unisys's program marketing manager for large-scale 1100 systems.

Although Unisys did not publicly announce the new models, customers were advised of the systems in August by the Unisys sales force, according to Brody.

Brody said Unisys will continue to offer the older models, even though users who have orders in place for them can change their order to the new models. The older models cannot be upgraded to the new systems. He said some users might still want the older models because they have several of the machines already running and may want to add another with all units running the same operating system.

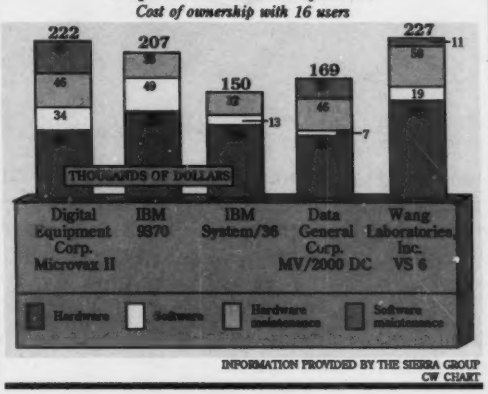
The new models require the latest version of the Unisys OS/1100 operating system.

Continued on page 60

Data View

Departmental office systems

Cost of ownership with 16 users



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

DEC inks co-op pacts

BOSTON — Digital Equipment Corp. used its recent Decworld '87 exposition as a forum to announce a series of partnerships intended to strengthen DEC's position in the engineering and computer-integrated manufacturing (CIM) markets.

Under a key agreement, Honeywell, Inc. is expected to develop an interface between its TDC 3000 process control system and DEC's VAX family of minicomputers. Honeywell said it will integrate VAXs into its process control offerings. A Honeywell official said his firm de-

Continued on page 59

NAS taps IBM Unix window

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems Corp. plans to tackle IBM on increasingly contested turf: the engineering/scientific marketplace.

Although the companies are vastly different in size, NAS said it believes the playing field is relatively even. That is because the engineering/scientific arena is dominated by a non-IBM operating system — Unix.

Through Unix, NAS hopes to provide a single window on four layers of computing: the workstation, departmental system, mainframe and supercomputer. If the effort proves successful, the value-added software segment of NAS's business would grow, reversing a five-year trend away from value-added software sales.

"I think we knew all along that value-added software was critical to growing our business," said Tom Frana, vice-president of NAS's Engineering/

Continued on page 59

Inside

- Wang transcribers translate stenography for use in applications. Page 62.
- Monochrome terminal offers VT220 emulation, Tektronix graphics. Page 65.

SYSTEM 2000® DBMS for Only $12,000

All the Extras Without the Extra Costs

You don't have to spend a bundle to get a full-function data base management system. For a first-year fee of $12,000, SYSTEM 2000® DBMS gives you:

- an integrated data dictionary
- on-line query/update
- a report generator
- relational data base access
- programming language interfaces
- high-quality training and technical support.

Renewal rates are even lower. Plus, you can now link SYSTEM 2000 DBMS with the SAS® System of software to build data bases, store and retrieve data, merge and manipulate data, perform your analyses, and produce reports and presentation graphics. You can even give Information Center users access to your DBMS through easy-to-use SAS menus.

Before you invest a bundle, find out why SYSTEM 2000 DBMS is the most economical data base management system in the industry.

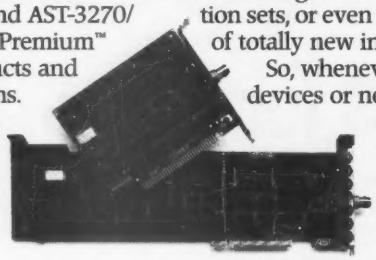
SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA.
Copyright © 1986 by SAS Institute Inc. Printed in the USA.

SAS Institute Inc.
Box 8000, SAS Circle
Cary, NC 27511-8000
(919) 467-8000 Telex 802505

We've Decided To Call Off The Competition Between IBM® and IRMA®.

It no longer matters which 3270 emulation will become the reigning standard.

Because now you can have compatibility with both IBM and IRMA using AST's two new micro-to-mainframe communications solutions: AST-3270/CoaxIIA™ for IBM Personal System/2™ Models 50, 60 and 80; and AST-3270/CoaxII™ for AST Premium™ Computer products and PC-based systems.



Which means you can run all existing application software designed to run on either IBM or IRMA hardware today. Or take advantage of our new family of high-function, 3270 emulation software for CUT, DFT and graphics modes.

Whichever software you choose, your organization's investment will be protected from obsolescence caused by the introduction of new 3270 devices or protocols.

Because built into the AST-3270/CoaxII family are custom processors enabling future modification of existing soft-loadable instruction sets, or even the development of totally new instruction sets.

So, whenever new terminal devices or new protocols come on the market, AST will offer diskette-based microcode upgrades.

It's that simple. And a lot less trouble.

Next time you need to make a micro-to-mainframe communication choice, go for a knockout and choose to have it all from AST.

For information on our trial evaluation program call us today **(714) 863-1480,** or fill out the coupon below and mail it to AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992.

AST® RESEARCH INC.

Yes, I want more information on AST-3270/CoaxII solutions.

☐ Have an AST Representative call me.

☐ Send me more information on AST's trial evaluation program.

☐ AST-3270/CoaxII

☐ AST-3270/CoaxIIA

Name _____

Title _____

Company _____

Address _____

City _____ State ___ Zip _____

Phone (___) _____

AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992. Attn: M.C.

9/28/87

AST markets products worldwide—in Europe and the Middle East call 441 568 4350; in the Far East call 852 5 717223; in Canada call 416 826 7514.

AST and AST logo registered and AST Premium, AST-3270/CoaxII and AST-3270/CoaxIIA trademarks AST Research, Inc. IBM registered and Personal System/2 trademark International Business Machine Corp. IRMA registered trademark Digital Communication Assoc. Copyright © 1987 AST Research, Inc. All rights reserved.

NAS

CONTINUED FROM PAGE 57

Scientific Operations. "We just went through a transitional stage of trying to find unique market opportunities that would allow us to be a key player.

"One of the reasons we like this market is that there is an emerging standard — Unix. The other thing we like is that there is no predominant player across all four layers of processing."

NAS hopes to present the end user with a single Unix interface to all four levels of computing by 1990. "The end user wants to be able to run the same applications, the same packages and compilers and to get the same results at each and every level of computing," Frana said. "They're looking for simplicity of use and the ability to develop code at the workstation level and to test it on the departmental or mainframe computer."

NAS's game plan is to enlist the help of as many as 60 other firms to create a series of value-added software products that will knit together four layers of computing. So far, the firm has established relationships with only four companies and is talking with five others.

"Right now, we're operating in roughly 2½ of the four tiers of computing," Frana said. "We're in the departmental and mainframe markets, but we're only beginning to evaluate offering supercomputer power at the high end and workstations at the low end."

To get things started in the workstation environment, NAS in July announced a joint development project with Sun Microsystems, Inc. Sun reportedly will customize its SunOS operating system to run under the NAS mainframe's IBM environment [CW, Aug. 3].

Tying into IBM and DEC

Another key to the engineering market, in which NAS now has 15% to 20% of its installed base, is communications with IBM and Digital Equipment Corp. computers. That technical gap is being bridged by Interlink Computer Sciences, Inc. in Fremont, Calif.

"Our relationship with Interlink gets us better connectivity and establishes communications between the IBM and DEC machines at fairly significant transfer speeds," Frana said. Future support for DEC's VMS operating system is also a possibility, although NAS developers are focusing on support for DEC's modified Unix system, Ultrix.

By answering the end-user requirements, NAS hopes to make inroads in top Fortune 500 accounts that are having trouble bringing their Unix design and engineering environment closer to the IBM world. "Many sophisticated users at automobile and aerospace companies have figured out ways to get around their connectivity problems. What we want to do is give MIS directors a data base access capability that will seamlessly tie together their Unix and IBM-compatible machines," Frana said.

Co-op pacts

CONTINUED FROM PAGE 57

veloped several such interfaces for non-Honeywell equipment in recent years, but the company's process control efforts have focused on Honeywell Bull, Inc. DPS-6 minicomputers, which were made by Honeywell until it spun off its information systems group last year. The official said the VAXs will complement, not replace, the DPS-6.

The other partnerships announced by DEC included system cooperative marketing program (SCMP) agreements and cooperative marketing program (CMP) agreements.

Engineering solutions for VAX

According to Don McInnis, DEC vice-president for engineering systems, the 10-year-old CMP procedure calls for DEC and its software vendors to cooperatively market what he called "total solutions." Under the 2-year-old SCMP plan, third-party vendors package their software with standard DEC hardware and software.

The computer-aided engineering division of Tektronix, Inc. in Beaverton, Ore., expanded its SCMP role to include printed-circuit board, gate-array and custom integrated-circuit design packages.

Logicraft, Inc. in Nashua, N.H., signed an SCMP pact under which it will provide its 386Ware server and Cardware circuit board to add Microsoft Corp. MS-DOS productivity tools to VAXs.

Other engineering-related agreements included the Computer-Aided Design Group in Marina Del Rey, Calif., which is providing CADG+FM facilities management software, and Scientific Calculations, Inc. in Fishers, N.Y., offering its Scicards printed-circuit board design application.

In addition to the Honeywell pact, the CIM-related agreements included Bailey Controls Co. in Wickliffe, Ohio, providing its Network 90 systems for distributed process control, Effective Management Systems, Inc. in Milwaukee offering its shop floor information and management systems for discrete manufacturing industries, Epic Data Corp. in Seattle supplying automated data collection systems and GE Fanuc Automation, Inc. North America in Charlottesville, Va., selling its numerical control and monitoring system.

Other agreements were made with BBN Software Products Corp. in Cambridge, Mass., Datalogix Formula Systems, Inc. in Hartsdale, N.Y., and Setpoint, Inc. in Houston.

WHERE ARE TODAY'S MOST SOPHISTICATED BUSINESS CUSTOMERS HEADED?

To NYNEX, one of the leading information management companies in the country. A company with a long heritage in communications. A company with $11 billion in revenues, $21 billion in assets. NYNEX, builder of information superhighways for companies large and small. NYNEX. Telecommunications, information systems and software. Everything you need to use information more efficiently. Everything you need to solve whatever communications problem you may encounter. To help you be more productive. That's our calling.

Come to booth #1041 at INFO '87, September 29–October 2, at the Jacob Javits Convention Center in New York to find out more about NYNEX and about the answers we can provide your business.

For referral information, 1-800-535-1535.

THE ANSWER IS NYNEX

Telecommunications • Information Systems • Software • Publishing • Business Services

© NYNEX Corporation 1987

Performance

FROM PAGE 57

IBMs for that matter.

The practical result, some say, is an impending revolution in the procurement process. Instead of comparing a number of claims about price/performance and MIPS, users will be able to choose an operating system, boot an application and start their stopwatches.

A multiuser horse race

In one recent case, Baxter Health Care Corp., formerly Baxter Travenol, put out a bid for a departmental system to run at 53 sites in the U.S. The application that would run on the machines, which handles billing and record processing, was already written in Unix. Although Baxter officially endorses only IBM and DEC as standards, the firm was prepared to see which bidder could run the application best.

The result, said Wayne Tracy, director of information services for Baxter's Home Respiratory Therapy division, was a horse race. The competitors — IBM, DEC, NCR, HP, Unisys and Texas Instruments — bid multiuser systems, including IBM's 9370, DEC's VAX 8250, HP's Spectrum and TI's System 1575. Based on a Unix benchmark sold by Neal Nelson & Associates in Chicago, the winner was the TI 1575, at $120,000.

Tracy said he plans to buy the system for 20 of the firm's 53 offices. The benchmark numbers were so convincing that they outweighed Baxter's standing orders for IBM, which freely participated in the horse race, and DEC, which balked at the starting gate but ultimately agreed to be tested.

It was the first time in 18 years that Tracy felt he had been able to compare machines equitably. "All the vendors tried to offer more subjective criteria for selection," he said. "But our largest investment is in the software, and we wanted the machine that would run it the best."

McDonald's recently carried out a similar exercise, using Nelson's benchmark to evaluate more than 20 Unix machines. It chose AT&T's Intel 80386-based workstations as remote systems for its U.S. company-owned stores.

"Users want to be able to compare pieces of iron," Tracy said. "As long as this performance data remains in the private domain, end users will not be able to make a choice based on the capability of a given piece of equipment."

Judging from Baxter and McDonald's, both large IBM shops, the emergence of Unix may be the start of something new in hardware procurement: the ability to choose freely from the wealth of systems.

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

Unisys

FROM PAGE 57

Brody said some users have already expressed a desire to go with the older machine.

However, George Lindamood, program director for industry service at the Gartner Group, Inc., expressed doubt as to who would want an older system. Lindamood termed the new models a "mid-life kicker" for the 1100 series and said the Model IIs narrowed a price/performance gap when compared with IBM's 3090 models.

He was lukewarm on the prospects for the 1100 line. "There will be a certain number of their clientele that will stay with them, but there will be some erosion of customers and no new accounts," he said.

The price of an 1100/91 Model II with 32M bytes of memory, a word channel module and system control software is $2.1 million, compared with the previous 1100/91 at $2.8 million. The dual-processor 1100/92 Model II in a similar configuration is 23% less than the previous 1100/92, which was $3.9 million. The three-way 1100/93 Model II costs $5.1 million, while the previous 1100/93 sold for $5.6 million. And the 1100/94 Model II is now $5.6 million, down from $6.7 million for the previous 1100/94.

In addition, a 32M-byte block of memory has been cut 23%, from $592,000 to $455,000.

"The data Fieldwatch™ gave us about the failure rate of a 62-cent part now saves us over $250,000 a year."

—Jim Shaffer
Project Manager
Bell & Howell Company

Find out how Bell & Howell and other leading corporations use information from Fieldwatch field service software to boost their bottom line—as well as give them a valuable competitive edge by increasing customer satisfaction. Call 1-800-247-1300 (617-272-4100 in MA) for our "Corporate Profiles" Series.

THE DATA GROUP CORPORATION
A WYMIX Company

The DATA Group Corporation
77 South Bedford Street, Burlington, MA 01803
West Coast Sales Office: 1750 Montgomery Street, San Francisco, CA 94111

Free Informix seminar.

As you may know, the Informix® line of SQL-based RDBMS products gives you full portability across VMS,™ UNIX,™ MS™-DOS and networked systems.

But for the full story, come to our free half-day Informix product seminar in any one of the cities listed below.

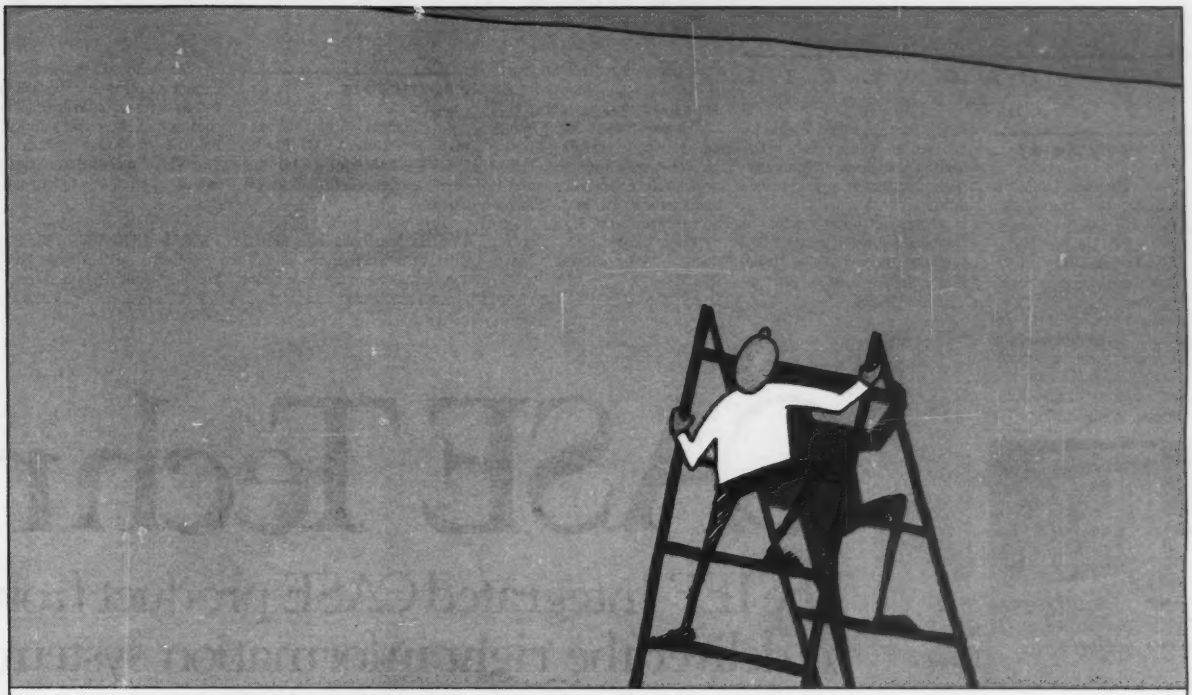
To RSVP—and to find out details—please call (415) 322-4100.

Cities	Dates
Atlanta	10/14
Baltimore	10/14
Boston	8/3, 9/14, 10/28, 11/18
Chicago	8/12, 9/15, 10/14, 11/9, 12/8
Dallas	10/20
Denver	10/16
Detroit	9/16, 10/15, 11/10, 12/9
Hartford, CT	10/6
Houston	11/6
Indianapolis	11/5
Los Angeles	8/3, 9/14, 10/28, 11/18, 12/8
Menlo Park, CA	11/5
Memphis	10/22
Minneapolis/ St. Paul	10/29
New Orleans	10/14
New York City	8/5, 9/16, 10/14, 11/18
North Jersey (Woodbridge)	8/19, 11/5, 12/2
Philadelphia	10/6
Phoenix	11/4
Pittsburgh	10/8
Portland	10/6
Raleigh, NC	10/27
Salt Lake City	10/15
San Francisco	8/5, 9/16, 10/14, 11/18
Seattle	8/7, 9/9, 10/7, 11/5, 12/2
St. Louis	10/20
Tampa	10/7
Washington, D.C.	8/7, 9/9, 10/7, 11/5, 12/2
Canada	
Montreal	10/19
Ottawa	10/20
Toronto	8/19, 11/5, 12/2
Vancouver	10/8
International	
Bonn	10/16
Frankfurt	10/15
London	10/13, 11/13, 12/3
Munich	10/6, 11/9, 12/1
Paris	10/8, 11/11, 12/2

INFORMIX

The RDBMS for people who know better.

Informix is a registered trademark of Informix Software, Inc. Other names indicated by TM are trademarks of their respective manufacturers. © 1987, Informix Software, Inc.



The problem with most 4GLs is they're finished before you are.

And where does that leave you?

With the final, tricky ten percent of your application yet to write, and no 4GL left to write it with. Sound familiar?

If so, try INFORMIX®-4GL.

Never again will you have to switch to C or COBOL to truly customize your application. Instead, INFORMIX-4GL provides an all encompassing syntax for every aspect of your application building.

So once you're programming in INFORMIX-4GL, you never have to leave it. And considering all it can do, you may never want to.

Now, for instance, you can write in just ten to twenty pages of 4GL code, applications that would take hundreds of pages with C.

That's because INFORMIX-4GL was designed from the start to be an application building language. It's built around the full implementation of ANSI Standard SQL. And features Custom Screen Generation, Custom Menu Building, a built-in Report Writer and Windows.

What's more, INFORMIX-4GL works with UNIX,™ VMS,™ MS™-DOS and Networked DOS operating systems. And, of course, it's compatible with INFORMIX-SQL—our popular, proven DBMS. So files you build with one, you can access with the other.

For more information and our free booklet, "A 20-Minute Guide to INFORMIX-4GL," call 415/322-4100.

Or write Informix Software, 4100 Bohannon Drive, Menlo Park, CA 94025.

And start taking your applications to even greater heights.

INFORMIX

The RDBMS for people who know better.™

INFORMIX is a registered trademark of Informix Software, Inc. Other names identified by TM are tradenames and/or trademarks of their respective manufacturers. © 1987, Informix Software, Inc.

NEW PRODUCTS

Turnkey systems

The **Sun Breeze** family of workstations for composition and makeup of display advertisements, based on the Sun Microsystems, Inc. Sun-3/50 workstation, has been announced by **Camex, Inc.**

The basic Sun Breeze model is said to be capable of handling type and rules. It can be expanded, in stages, up to full-type and scanned-image capabilities. Multistation configurations are

Camex's *Sun Breeze*

interconnected via Ethernet local-area networks (LAN). A software package, called Zephyr, permits a Sun Breeze unit with a disk to double as a file server for all workstations on the LAN.

A stand-alone model with a 141M-byte disk and a 60M-byte cartridge tape costs $21,500, including application software and a typesetter driver for the Camex Supersetter. A four-workstation Zephyr configuration with two disks and a cartridge tape costs $79,000.

Camex, 75 Kneeland St., Boston, Mass. 02111.

An on-line check processing system designed for financial institutions that processes up to 5,000 document passes daily has been announced by **NCR Corp.**

The NCR 7720-3101 reportedly offers single-step item processing. Users can communicate on-line with remote data centers for regular account updating. The system records up to 100 distributions and 300 totals, encodes with up to 15 line formats, offers five different check digit-verification schemes and uses intelligent sorting to feed items into up to 12 pockets.

Other features include a thermal journal printer and movable personal computer and proofing keyboards. Modules include a CRT, an encoder, a reader, an endorser, an NCR PC6 processor and single, dual, six or 12 pockets.

A single-pocket system costs $19,389.

NCR, 3095 S. Kettering Blvd., Dayton, Ohio 45439.

A series of automated computer-aided transcription offerings for court reporters and the court-related transcription industry has been announced by **Wang Laboratories, Inc.**

The series, called **Wangcat**, is based on Digitext, Inc.'s Digitext-ST single-unit computerized stenographic-type keyboard system.

According to the vendor, by combining translation logic and a patented theory of shorthand, stenographic strokes are instantly translated into English or other languages for use in text and data entry applications.

Three versions of the Wangcat system are available: a portable courtroom version, a laptop version and a stand-alone professional model. Prices range from $14,999 to $30,625.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Processors

A development system for Texas Instruments, Inc.'s VME/PDOS, the **VV-11/Model 1610**, has been announced by **Zoltech Corp.**

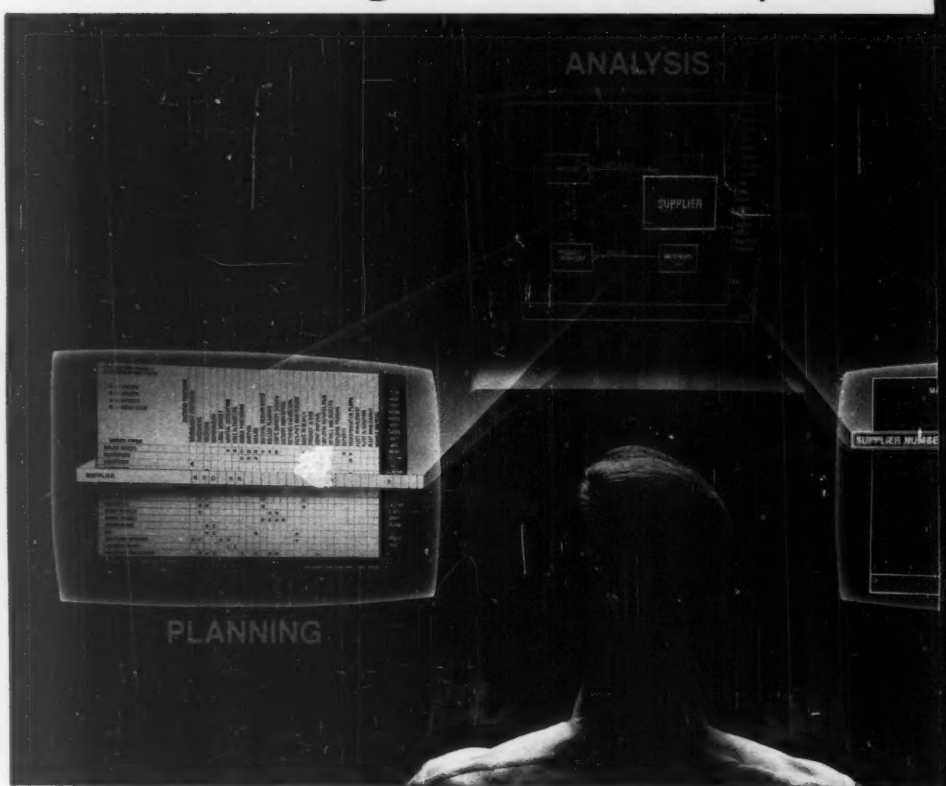
The Model 1610 features a 10-MHz Motorola, Inc. 68010 CPU with 512K bytes of random-access memory. Two serial I/O channels and a parallel printer port are standard. The system comes with a 20M-byte Winchester disk drive and an 800K-byte 5¼-in. floppy disk drive. The VSV-11 chassis includes a five-slot card cage with four slots free.

The basic desktop VV-11/Model 1610-A costs $5,995.

Zoltech, 7023 Valjean Ave., Van Nuys, Calif. 91406.

CASE Techn

The IEF™ integrated CASE product from to deliver the right information systems



IEF supports the entire systems life cycle from planning, analysis, and design through code generation, data-base generation, and maintenance.

The MIS world is being asked to develop innovative information systems with all the speed and accuracy automation makes possible today. The demand for applications is increasing. The Texas Instruments Information

The **CPU-22/23**, a 32-bit computer board designed for IBM's VMEbus, has been announced by **Force Computers, Inc.**

The 32-bit multiprocessing computer runs the Motorola, Inc. 68020 microprocessor and Motorola 68882 floating-point coprocessor at either 16.7 or 20 MHz. Up to 21 CPU-22s or 23s can share a backplane. Features include up to 1M byte of dual-port static random-access memory with interleaved operation between the VMEbus, CPU and direct-memory accesses; one-wait-state erasable programmable read-only memory architecture; 32-bit direct-memory access controller; and message passing capability.

The CPU-22/23 is priced from $6,475.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Datacube, Inc. has introduced **Megastore-8**, a digital video-image frame store for its Maxvideo family of VMEbus-compatible real-time image and digital-signal processing boards.

Megastore-8 is a single, standard double-height VME module that occupies one slot in a VME backplane. It is said to be capable of storing up to 8 million pixels as either large, high-resolution individual images measuring 2,048 by 4,096 by 8 bits or up to 32 standard-size images.

Megastore-8 has six Maxbus ports connected to a data cross-point switch. Each Maxbus data port is a 10M byte/sec. channel.

Megastore-8 is priced at $11,950.

Datacube, 4 Dearbord Road, Peabody, Mass. 01960.

A desktop computer-aided design (CAD) terminal, called the **DS 1082GXP**, has been announced by **Spectragraphics Corp.**

The DS 1082GXP consists of a 16-in. color monitor with 1,024- by 1,024-pixel resolution, an IBM 5080-style keyboard, a mouse and a below-desk display controller.

The base price for the DS 1082GXP is $11,900, which includes 1M byte of display-list memory, optionally expandable to 2M bytes. The base configuration is said to be compatible with the IBM 5080 Model 2A and is fully equipped to run IBM's Cadam or Catia software.

Spectragraphics, 10260 Sorrento Valley Road, San Diego, Calif. 92121.

Graphics systems

A color video processor said to process color images from most video screens in 4,096 or 125 colors has been announced by **Graftel Systems, Inc.**

The processor, called the **VP240**, is also said to be capable of transferring the entire image to most color printers or plotters through the use of built-in firmware for each output device.

The VP240 is priced at $4,495 for a 2M-byte model, including the firmware for the selected output device.

Graftel Systems, Executive Park, 400 Executive Blvd., Elmsford, N.Y. 10523.

Data storage

A 170M-byte add-on drive for the AT&T 3B2/400 computer has been announced by **Congruent Technologies, Inc.**

The drive, called the **Superstore/170**, is field-installable in one of the unused drive slots on the Model 400 or can be a replacement for one or both of the existing 72M-byte drives on the system. The drive may also be used on an AT&T XM expansion module attached externally to the 3B2/300, 310 or 400.

The drive performs with a 28-msec average access time, the vendor said.

The Superstore/170 costs $5,950.

Congruent Technologies, 9065 Jollyville Road, Austin, Texas 78759.

Cambex Corp. has introduced two IBM Series/1 data storage and backup peripherals.

The **Certainty 250-20** disk-storage system offers 512M bytes of disk storage. The **Certainty 820-10** streaming tape system can back up 260M bytes of data.

The disk-storage system is available in 512M-byte incre-

Continued on page 65

ologies:

Texas Instruments enables you faster with better quality.

"After an 18-month investigation of systems-development methodologies, we adopted Information Engineering because of its rigor and breadth. It supports the entire systems life cycle."

—Dale Hull, Amoco Corporation

The IEF automates the widely accepted Information Engineering methodology. Information Engineering focuses on shared data and processes to build systems. With it you can put systems in place faster, with greater accuracy, fewer revisions, less maintenance, and full documentation. The IEF has revolutionized the group of products that has come to be called CASE.

In supporting the planning, analysis, and design stages of the systems life cycle, the IEF provides a series of diagrams to speed development, improve accuracy, and enhance communication with your users. The information derived from the diagrams is stored in the form of a business model in a central encyclopedia. Subsets of the model can be used simultaneously by multiple systems developers and then merged back into a consolidated model of the business. Code and data bases are automatically generated from the information contained in these models.

"We have achieved higher-quality results in less time using IEF. It facilitated the integration of data and processes during systems analysis and provided more complete documentation."

—Tom Funk, U.S. Navy

Texas Instruments provides a full range of support services to assist you in providing systems solutions to business problems. Our product support includes embedded help, software guides, and methodology documentation. Training and consulting services can be conducted at your site or at TI.

"With an eye toward the future, TI is investing more than $400 million a year in research and development. A focus of our R & D is the key technologies of the information age, including Expert Systems, Object-Oriented Data Bases, and Natural Language. Aspects of these technologies have already been introduced in our CASE product and hold significant promise for advanced versions of the IEF. We're committed to CASE. We believe IEF truly defines the term Computer-Aided Software Engineering." — George H. Heilmeier, Senior Vice President and Chief Technical Officer, Texas Instruments Incorporated.

Engineering Facility™ (IEF) CASE product can help you meet this demand as well as the challenge of your expanding role in the development of information-based products and services that give your company a competitive advantage.

Find out how TI's Information Engineering Facility can change the way you look at the future. For more specific product information, call (214) 575-4404. Or write IEF Sales and Marketing, Texas Instruments Incorporated, P.O. Box 869305, MS 8474, 6550 Chase Oaks Blvd., Plano, Texas 75086, for our IEF brochure, which gives more information on the whole integrated product.

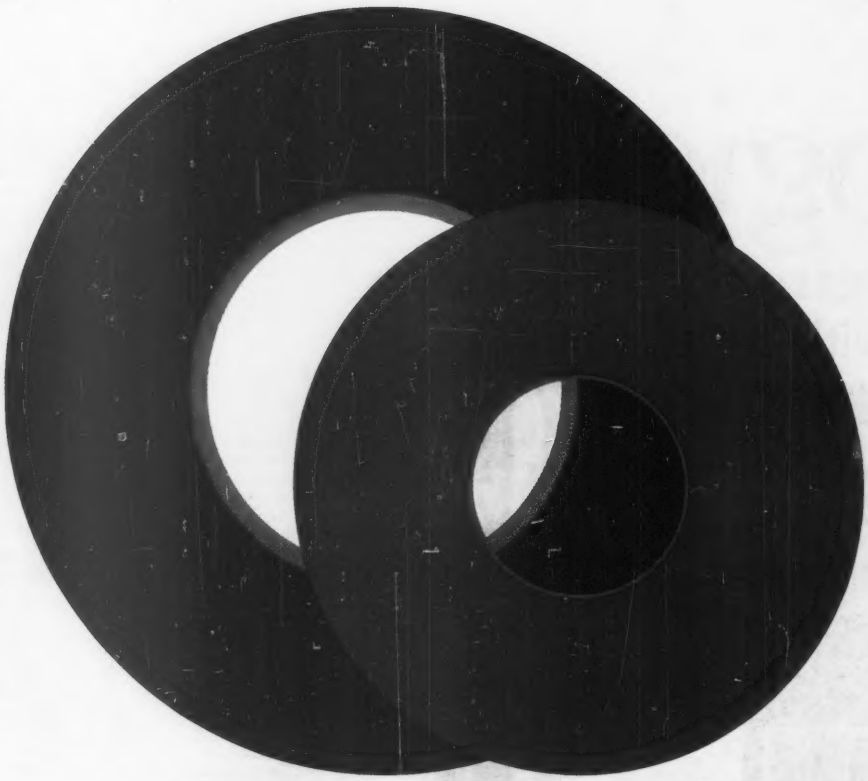
™ IEF and Information Engineering Facility are trademarks of Texas Instruments Incorporated. The IEF product has been developed with the contribution of James Martin Associates Ltd.

27-2003 © 1987 TI

TEXAS INSTRUMENTS

How our storage products' technology can boost your systems' productivity. No. 3 in a series.

The "industry standard" disk. Our disk.



When it comes to data storage disks, smaller is better; and we offer you the smallest.

Ours are 10.5" in diameter vs. the "industry standard's" 14." That's why our direct access storage device's (DASD) footprints are up to 40% smaller than theirs.

That's also why our disk enclosures can be sealed in clean rooms. Smaller disks make for smaller enclosures that stay cooler and hence don't need air from your data center.

So they're less susceptible to environmental contamination... and more reliable as a result.

Finally, when your disks are small, you don't need a great big motor to drive them. Which is why our DASDs consume less energy.

Our DASD technology also increases your data availability which we'll tell you more about in subsequent ads.

For now, though, just remember this: Small disks can deliver a big boost to your systems' productivity. And ours are smallest.

For specs on our full line, call your local Amdahl representative.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3470

amdahl®
The VALUE Choice

Continued from page 63

ments, each disk requiring only half the cabinet width in the Series/1 rack enclosure. It comes with a standard cache-memory size of 512K bytes.

The streaming tape system, an industry-standard ¼-in. tape system, offers an unattended backup capability of up to 260M bytes.

The Certainty 250-20 costs $29,500. The Certainty 820-10 costs $9,950.

Cambex, 360 Second Ave, Waltham, Mass. 02154.

Terminals

A coaxial IBM 3191 plug-compatible information display station called the **Miracle-191** has been announced by **Term-Tronics, Inc.**

The Miracle-191 features a screen-image printer port and record/playback keys. Options include integrated light pen and bar code applications as well as a separately addressable printer port that provides IBM 3287-type printer emulation.

Term-Tronics' *display station*

The Miracle-191 costs $1,295.

Term-Tronics, 4990 Viewridge Ave., San Diego, Calif. 92123.

A series of intelligent workstations — the Models 1210, 1220, 1240 and 1285 — have been added to **Telex Computer Products, Inc.'s Intelligent System Series** product line.

The 1210, 1220 and 1240 are based on the Intel Corp. 80286 microprocessor. The 1210 was designed for local processing. Fully configured and featuring a network interface, it costs $2,495.

The 1220 offers a 3½-in. disk drive option, integrated video and local-area network (LAN) support. Its price starts at $2,715.

The 1240 offers two half-size drive bays with either 3½- or 5¼-in. media support and four expansion slots. Its price starts at $3,170.

Telex's Intel 80386-based 1285 was designed for use as a LAN server in computer-aided design and manufacturing applications or for desktop publishing. Prices start at $5,965.

Telex, 6422 E. 41st St., Tulsa, Okla. 74135.

The **Go-225** monochrome terminal, which was designed to provide Digital Equipment Corp. VT220 emulation and Tektronix, Inc. graphics, has been announced by **Graphon Corp.**

The terminal offers such standard features as integrated text and graphics functionality, 60Hz noninterlaced display and two memory planes. Resolution is 1,024 by 390 pixels. Support is provided for up to eight pages of linked text.

The terminal can be upgraded with such options as pan and zoom, multiple graphics planes and raster operations.

The Go-225 costs $795.

Graphon, Tower One, Fifth Floor, 1901 S. Bascom Ave., Campbell, Calif. 95008.

Printers/Plotters

McDonnell Douglas Computer Systems Co. has introduced **dot matrix, band** and **laser printers** for use with its relational data base management minicomputers and Series 7000 Integrated Business System.

The 10 page/min. laser printer, Model 2-1810, features 300 by 300 dot/in. character registration. It costs $4,000.

The Models 2-1010 and 2-1020 nine-pin dot matrix printers offer 110 and 136 column widths at 10 char./in., respectively. Print speeds are switch-selectable at 180 and 45 char./sec. Each costs about $700. The Model 2-1210 nine-pin, 300 char./sec. dot matrix printer costs $2,595; the Model 2-1220 18-pin, 400 char./sec. dot matrix printer costs $3,295.

The band printers are the Model 2-1610 for $8,500 and the Model 2-1620, which sells for $11,000. They offer speeds of 300 line/min and 600 line/min, respectively.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

Vector-to-raster converters that are said to offer users of Versacad software the ability to output vector data files in addition to plotting to hard-copy devices have recently been announced by **KMW Systems Corp.**

The **VP-10** converter was designed to drive low-cost devices such as A/B size color thermal printers and lasers as well as electrostatics with widths of up to 24 in.

Drawing files can be sent from Versacad to the VP-10 in Hewlett-Packard Co.'s Graphics Language, according to the vendor.

The **VP-30** was designed to drive electrostatic plotters with widths of up to 44 in.

Drawing can be sent to the VP-30 in its native format.

The VP-10 costs $5,995. The VP-30 costs $21,500.

KMW, 6034 W. Courtyard Drive, Austin, Texas 78730.

INTELLECT. DP/MIS PRODUCTIVITY SOFTWARE FOR DB2 AND SQL/DS

Take another look. Now INTELLECT, the first successful AI software tool for IBM mainframes, helps DP/MIS build and maintain DB2 and SQL/DS applications. INTELLECT delivers efficient application building and prototyping, generates expert SQL code, and virtually eliminates user request backlogs. Over 500 organizations worldwide use INTELLECT.

INTELLECT improves DP productivity for DB2 and SQL/DS with:

1) SQL code generation
2) Production system prototyping
3) Application modification and maintenance
4) SQL training facility
5) DB2 and SQL/DS catalog query
6) DB environment monitoring

For management, INTELLECT provides fast English access to complex databases. And INTELLECT's PC Link sends mainframe data directly to workstations in the format users want.

In addition to DB2 and SQL/DS, INTELLECT gives you natural language interfaces to FOCUS, Teradata's DBC/1012, and our own DFAM design.

Attend a free INTELLECT seminar and demonstration. Take the first step in dramatically improving your DB2 or SQL/DS productivity with natural language today.

INTELLECT SEMINARS

Atlanta	October 14
Chicago	October 8
Hartford	October 21
Los Angeles	October 8
Minneapolis	October 15
New York City	October 6
San Francisco	October 6
Secaucus	October 22
St. Louis	October 13
Toronto	October 20
Washington, D.C.	October 13

CALL (617) 890-8400

☐ I'll attend a free INTELLECT seminar.
City_____ Date_____
☐ I can't attend, but send a FREE brochure.
Name_____
Title_____
Company_____
Street_____
City_____
State_____ Zip_____
Telephone ( )_____

INTELLECT is a trademark of Artificial Intelligence Corporation. DB2, SQL/DS, and IBM are registered trademarks of International Business Machines Corporation. DBC/1012 is a product of Teradata Corporation. FOCUS is a product of Information Builders, Incorporated.

AICorporation

USING AI TO DELIVER INFORMATION TO MANAGEMENT

Artificial Intelligence Corporation 100 Fifth Avenue, Waltham, MA 02254-9156 (617) 890-8400, Telex 989606

Wyse takes the high cost out of high resolution.

At $999, the WY-700 Graphics Subsystem is easily affordable. And its 1280 x 800 resolution makes the best of software packages like these:

DESKTOP PUBLISHING
Ventura Publisher
PageMaker/PC
Frontpage
DeskSet
Pagemaster
Rim System
Compound Document Processor
Display Ad Make-up System
AdvanTex

GENERAL PC SOFTWARE
Lotus 1-2-3
Symphony
PC-Paintbrush

COMPUTER-AIDED DESIGN
AutoCAD
Cadvance
In-A-Vision
Generic CADD
VersaCAD ADVANCED
Workview
Procad PC
P-CAD Systems

GRAPHIC SYSTEM TOOLS
MS-Windows
GEM
MetaWindows
HALO
KEE PC

Wyse raises the standards for high resolution graphics, while lowering the cost.

Now you can have high resolution and full IBM software compatibility.

So Desktop publishing applications can get the screen treatment they deserve. You can run spreadsheets like Lotus 1-2-3 with four times more data displayed on the screen. Computer-Aided Design packages can deliver their full potential. And Graphics-based pc environments finally have the high resolution they were made for.

You can do it all on the WY-700. A complete system, monitor and board, for just $999. With a large 15-inch display, full tilt and swivel, and a crisp 1280 x 800 pixel resolution.

The WY-700. It's your best solution for high resolution.

Write Wyse Technology, Attention: Marcom Dept. 700, 3571 N. First Street, San Jose, CA 95134. Or call toll-free, today, for more information.

Call 1-800-GET-WYSE

WYSE

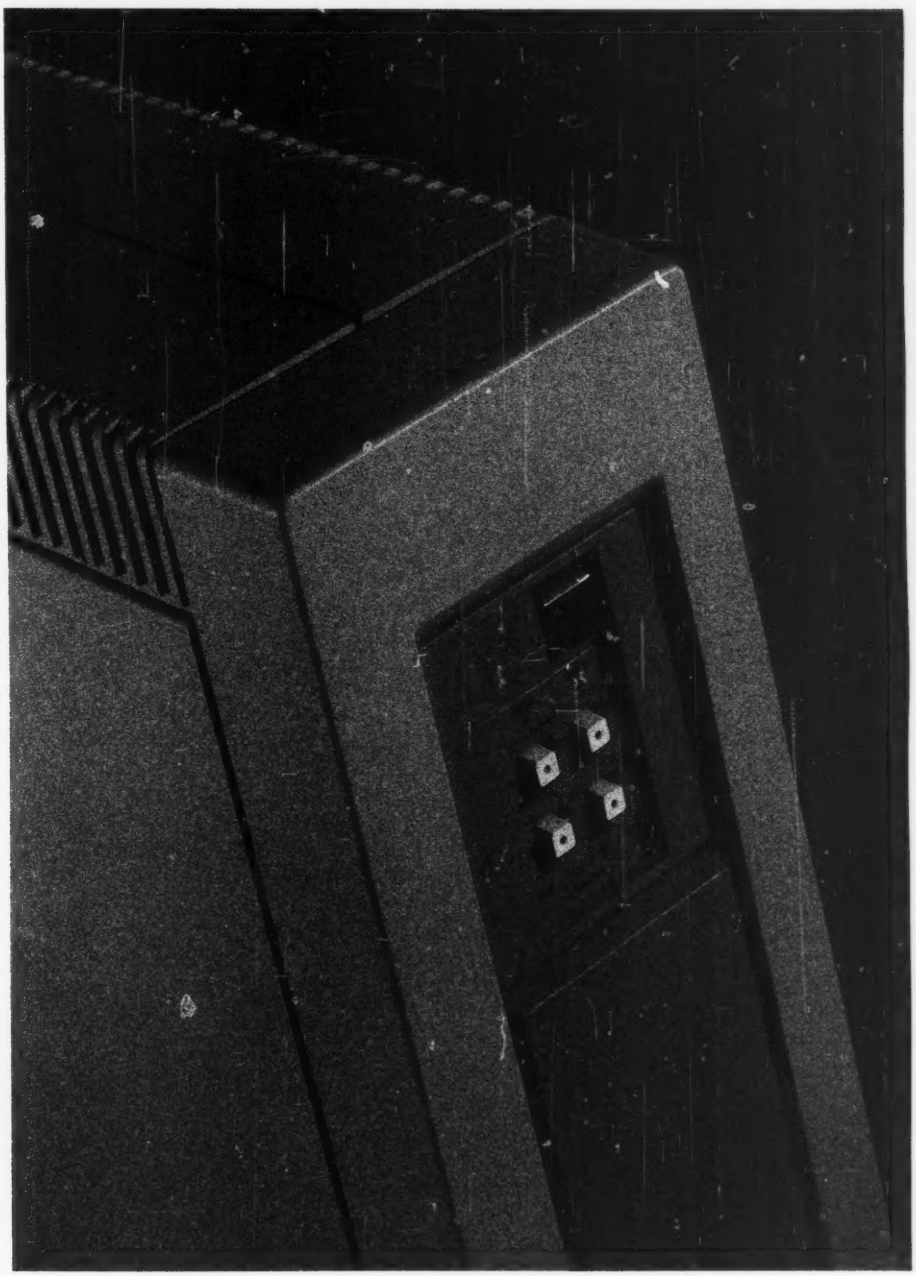
YOU NEVER REGRET A WYSE DECISION.

WYSE is a registered trademark of Wyse Technology. WY-700 and the "V" shaped design are trademarks of Wyse Technology. © 1986 Wyse Technology.

COMPUTERWORLD

SPOTLIGHT

SMALL SYSTEMS



The second installment of CW's 1987 Hardware Roundup covers small systems. From "smallframes" to Silverlake, what has — and hasn't — happened in the last year.

Workaholics

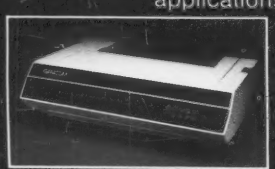
THE GENICOM 3000 SERIES

Printers that don't know when to quit

Business success demands hard work. That's why more and more businesses depend on the Genicom 3000 series. Six hardworking, reliable printers that make life easier.

You name it.
The 3000s can handle it.

No matter what you need in a rugged business printer—3000's your number. Just look at these job qualifications. Data processing printing at a blazing 400 cps. Letter quality at an unmatched 180 cps. And reliable paper handling for even the most demanding applications.



Need a trained specialist? The 3000s are ready. With extra quiet printers that crank the work out at under 55 dBA. Printers with seven color capability for presentation quality business graphics. Even printers for bar codes.

Best of all, there's a 3000 series printer built specifically for your office. For dependable printing with everything from a single PC to a multi-terminal information system.

Real team players.

The 3000 series printers make fast friends with their co-workers. Because they're compatible with any computer worth mentioning. And software packages like Lotus 1-2-3®, Symphony® and WordStar®.

So, don't waste time with a clockwatching printer. Hire one of the workaholics. A Genicom 3000 series printer. For more information, contact your nearby Genicom dealer.

Or call 1-800-437-7468. In Virginia, call 1-703-949-1170.

Lotus 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. WordStar is a registered trademark of MicroPro International.

GENICOM®

The Printers That Mean Business.

Genicom Drive, Waynesboro, VA 22980

INSIDE

Hardware Roundup
Buyer's guide chart for small systems. Pages S4-S12.

How It Was Done
What are small systems and where do they fit in? A description of how CW compiled this year's round-up of small systems. Page S2.

Vax Killer Hopefuls
Will the IBM 9370 be able to kill the VAX, or might the forthcoming Silverlake do the job? Or can VAX be overcome at all? Page S3.

SENIOR EDITOR
Joanne Kelleher

ASSOCIATE EDITOR
Deborah Fickling

RESEARCHER
Sally Cusack

DESIGN EDITOR
Marjorie Magowan

ASSISTANT RESEARCHER
Bonnie MacKeil

INTERN
Jeff Goodwin

HARDWARE ROUNDUP EDITOR
Kelly Shea

Cover photo:
P. Charles Ladouceur
(Small system unit courtesy of American Digital Systems, Inc.)

Copyright 1987 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld Spotlight is forbidden without written permission. Send all requests to Nancy Shannon, CW Communications/Inc., Box 9171, 375 Cochituate Road, Framingham, MA 01701-9171.

Bigger boxes beware: Multiuser 386-based systems, Microvax 3000 bring up-and-down market to new heights.

MORE POWER TO SMALL MACHINES

BY STANLEY GIBSON

Major developments at a glance

The year in small systems since the last Hardware Roundup

▶ **November 1986:** DEC brought Microvax II and Vaxstations into Vaxcluster. HP announced 16-user Micro 3000 and 56-user Micro 3000XE to replace HP 3000 Models 37, 37XE and 42.

▶ **January:** IBM declared commitment to dual mid-range strategy consisting of its "System 3/X" and 9370 products.

▶ **February:** DEC announced Microvax 2000, which can handle four directly connected users; at a price less than $10,000, it became DEC's lowest cost multiuser system.

▶ **March to September:** Several 80386-based multiuser systems were introduced by Prime, Fujitsu Microsystems, Altos, Unisys, TI and AT&T.

▶ **July:** IBM "opened kimono" on future plans at meeting for consultants in Dallas; the "System 3/X follow-on," also known as "Silverlake," will appear in 1988. Attendees were told at what was described as the most open meeting ever held by IBM. DEC announced duplexed version of Microvax II.

▶ **August:** DG introduced new versions of year-old MV/7800 processor that are 45% faster than the machines they replaced.

▶ **September:** Unisys unveiled "small-frames," Models A1, A4 and A6, intended to counter IBM's 9370 strategy. DEC rolled out Microvax 3500 and 3600 models, aimed at the middle to high end of IBM's 9370 line.

CW CHART

Small systems are continuing their inexorable march toward being ever smaller, ever more powerful, ever more threatening to vendors of larger systems — and ever a better deal for users. The progress of these systems in the past year was marked by two major announcements: Digital Equipment Corp.'s Microvax 3000 models and the multiuser systems based on the Intel Corp. 80386 chip that were introduced by a number of manufacturers.

On the IBM front, the dearth of announcements in the past year created a pregnant pause before the anticipated advent of the so-called "Silverlake" next year. Although it has not been formally announced, news of the product that will reportedly merge IBM's System/36 and 38 lines has been liberally distributed to users and consultants by IBM. IBM has also indicated that an enhancement to the System/36 line, possibly a low-end machine, can be expected before the end of the year.

With its Microvax 3500 and 3600, DEC has made its strategy clear: It will counter the IBM 9370 and Silverlake by building on the spectacular success of the 2-year-old Microvax II.

The models, introduced at Decworld '87 earlier this month, each offer processing power of about 3 million instructions per second (MIPS) — about three times the 0.9 MIPS rating of the Microvax II. Both models can support some 60 users for an All-In-1 implementation, about three times as many users as does the Microvax II.

The recently announced machines gain their power from a new CMOS microprocessor that boasts about four times the cycle speed of the Microvax II CPU. The 3500 is offered in a 16M-byte version, and the 3600 comes as a 32M-byte model.

However, in the hoopla surrounding the new Microvax models, it is important not to overlook other DEC small-system developments made in the past year. In November 1986, DEC brought its Microvax II and Vaxstations into the local-area Vaxcluster. In February, it introduced the Microvax 2000 — starting at less than $10,000 — which, according to DEC, can handle four directly connected users, up to 16 on a network. DEC's lowest cost multiuser system offers the same CPU performance as the Microvax II but at half the price.

In July, DEC introduced a duplex version of its Microvax II for applications requiring hardware redundancy. The product could remain a solution for a limited niche market, but it might also presage more fault-tolerant offerings from DEC.

While the Microvax II spurred offerings from competitors Data General Corp. and Wang Laboratories, Inc. in previous years, little of the Microvax's thunder has been stolen by these contenders. By upping the ante with the Microvax 2000 and 3000, DEC pointedly raises the question of whether DG and Wang will be able to keep abreast in the low end of the market.

However, DG pushed its small systems' performance forward, announcing faster versions of its year-old MV/7800 processor series. Both versions — the MV/7800 XP, which is rack-mounted, and the office environment MV/7800 DCX — are 45% faster than the machines they replace, according to DG.

Just this month, Unisys Corp. answered the challenge posed by the Microvax II and IBM's

Gibson is a *Computerworld* senior writer.

More power

FROM PREVIOUS PAGE

9370 by introducing its models A 1, A 4 and A 6. The minicomputers, which Unisys is calling "smallframes," offer significant improvement in price and performance over preceding Models A 2, A 3 and A 5 from Burroughs Corp.

Mirroring IBM's Solutionpac application software packages, Unisys announced Solution Partner packages, which contain vertical-market application software, a hardware configuration and support.

With a base CPU price of some $25,000 for an A 1 model, Unisys is offering fully configured turnkey systems in the neighborhood of $125,000. In a notable contrast to IBM's early 9370 announcement, Unisys did not unveil its new A series models until two of the three processors were set to ship.

What's up with IBM?

Trying to divine the obscurities of IBM's mid-range strategy has kept many analysts in business for the past several years. However, in January, IBM clarified matters when it declared its commitment to a two-architecture mid-range.

In a transparent reference to DEC, IBM Vice-President Larry Ford declared that two architectures were better than one. But on the heels of that pronouncement, IBM personnel demonstrated two office Solutionpacs, which make its System/36 and 9370 look and act alike, seemingly contradicting the proclaimed virtues of disparate hardware.

Indeed, cross-system consistency has long been a customer demand, and IBM is moving deliberately to address it. According to John Nack, president of IBM users group Guide International, Inc., such a function has, for the past decade, been at the top of Guide members' lists of requirements. The two office Solutionpacs were a response to this need, but many view them as merely the herald of the greater consistency that is promised by Systems Application Architecture (SAA).

With the announcement of SAA, IBM designated the languages Cobol, Fortran and C to be supported by the architecture. Absent at first were RPG-II and RPG-III, the languages used with the System/36 and 38, respectively. However, IBM has since let it be known that both would be part of SAA. This indication adds long-term credibility to the System/36 and 38 and depth to the looming Silverlake.

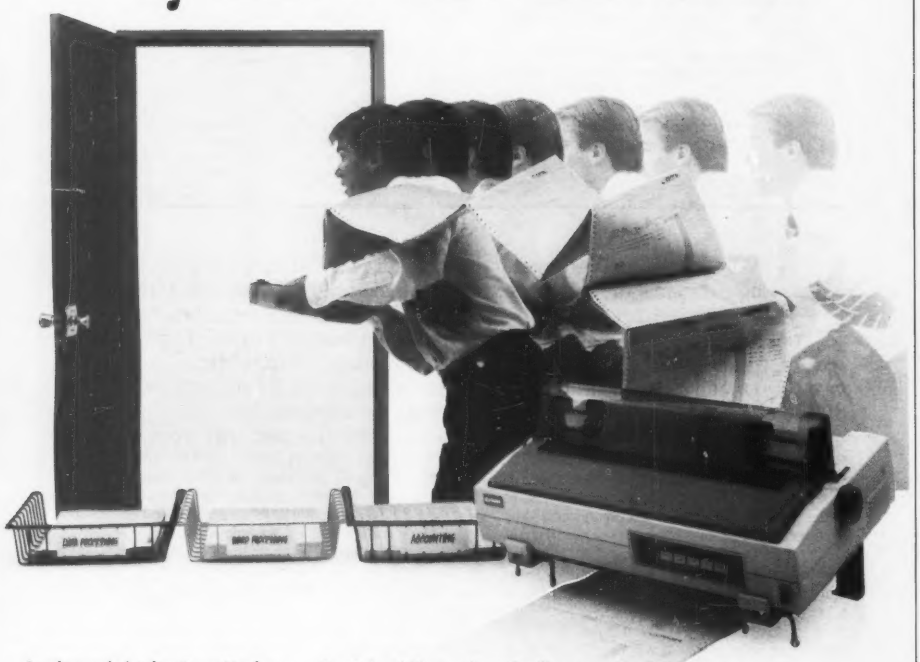
In order to keep System/36 and 38 customers in the fold, IBM has been entertaining them at its Rochester, Minn., plant, where several have reported being told of Silverlake, which IBM has been referring to as its System/36 and 38 follow-on product.

IBM told consultants at a July gathering in Dallas many of the same details, including the fact that the system would not appear until well into 1988. These disclosures have made the product's general

Continued on page S3

The C-815 Supra 24-pin printer

My life in the fast lane



I used to spend a lot of my time waiting for our old printer to finish cranking out the paperwork for our busy corporation.

But since we bought the C-815 Supra from C. Itoh Digital Products, I never have a moment to spare. I'm living life in the fast lane.

Multi-applications solution

Our department managers love the C-815 Supra. It's like having two printers in one. It prints high volume data processing output, like invoices and spreadsheets, at speeds up to 570 characters per second (cps). And for word processing, the Supra prints sharp, clear, high-speed letter quality at 162 cps.

What really sold our DP/MIS management on the Supra was *Byte Magazine* and *Infoworld* listing the C-815 as the fastest 24-wire printer in their independent tests. And they were right. The Supra's speed and versatility increased our productivity.

Forms expert

Our executives are really impressed with the Supra's dependable, rugged paper handling. It manages continuous forms, labels, letterhead and up to 6-part invoices with its rear or bottom feed paper paths. In addition to its standard pull tractor, the C-815 also features a single-bin automatic sheet feeder that's upgradable to dual bin.

Whether it's high volume spreadsheets and multi-part invoices or letter quality business letters and presentations, the Supra is fast and reliable.

Sound investment

The finance department says the Supra is a great investment since C. Itoh has a long-standing reputation for high quality, durable printers. And because it has built-in emulations for the IBM ProPrinter XL,™ Toshiba P351™ and Qume Sprint 11,™ we don't have to invest in any new systems or software. It works with our new IBM PS/2™ family and such popular software packages as Lotus 1-2-3,™ WordPerfect™ and Chartmaster.™

With its top-notch output, superior paper handling and extremely fast printing, all the departments in our company now know what life in the fast lane is all about. I know I do.

C.ITOH

C. Itoh Digital Products, Inc.

19300 South Hamilton Avenue, Suite 110
P.O. Box 9085 • Torrance, CA 90508
(213) 327-2110 or (800) 423-0300

Round'em up: Part II

This week, *Computerworld* offers the second installment of the 1987 Hardware Roundup — a compilation of vendors, systems and the characteristics of each system. The information was compiled by mailing questionnaires to vendors of large, medium-scale and small systems, as well as to personal computer and workstation manufacturers. In this issue, we cover the small systems market.

Where possible, the parameters used to group small systems with their likely competitors come from definitions provided by the market research firm International Data Corp. (IDC). According to IDC, small systems usually support two to 16 users in a normal commercial environment and generally cost from $10,000 to $100,000.

Outside the commercial environment, small systems are used in automation and control capacities as well as in communications processing. In those cases, the number of users is often not a realistic measure of performance.

The small systems category includes machines termed 16-bit minicomputers, 16- and 32-bit supermicrocomputers and low-end versions of traditional 32-bit superminis and business systems.

We have been as comprehensive as possible in the presentation of the information in chart format (see pages S4-S12). When vendors did not respond, CW estimated the information if it was appropriate to do so, using the most recent vendor literature and press releases.

In some cases, for instance, CW estimated million instructions per second, or MIPS, figures. This was done with the intention that the ratings be used only as a guide for users to position a system within the proper category and with the understanding that not all vendors approve of their use as a basis for comparison.

In the roundup charts, "NA" can stand for "not applicable" as well as "not available."

More power

FROM PAGE S2

shape nearly as clear as some products that have been formally announced.

IBM's virtual preannouncement of Silverlake has caused some users to hold off on purchasing decisions in anticipation of the product and has kept some, as was no doubt intended by IBM, in the firm's domain.

The Silverlake disclosures recall the early announcement of the 9370, made nine months before the shipment of the first systems and more than one year before shipment of all models.

Despite the long lead times, there is little doubt that IBM will do what it says: pursue both the 9370 and the System/36 and 38 follow-on. And while the computer community has fixed on the 9370 as a VAX killer, some analysts say that Silverlake is the knight that will slay the VAX dragon (see story this page).

Whichever is the VAX killer, one or both should have an impact, says George Colony, president of Cambridge, Mass.-based Forrester Research, Inc. "Both Silverlake and the 9370 aim a bullet at the VAX. Both will be deadly," he says.

The third prong

In the meantime, while the VAX faces a two-pronged threat from the 9370 and Silverlake, a third force is gathering that will be a strong contender for large market share, giving nonproprietary chip systems makers a role to play.

Multiuser 80386-based systems could rampage through the low end of the market and, in the process, force IBM to bring its own multiuser 386 system to market much earlier than it otherwise might have. On the other hand, lack of applications and support could cause this wild card to flop, and it could become known as the industry standard that never was.

Several multiuser 386 systems made their appearance in the past year. The new machines boast low prices, and several, with up to 6 MIPS in the 20-MHz 386 version, make strong bids to be the price/performance leader. Quite a few of these systems use Unix, under which value-added resellers (VAR) are putting together packages for vertical markets. Most of the systems also run Microsoft Corp. MS-DOS as a guest.

Compatibility with whatever standard IBM might introduce in a multiuser 386-based Personal System/2 could become an issue, but by the time IBM makes its offering, a number of multiuser 386 systems could be well established.

While some of the 386-based systems are being offered by small firms, Prime Computer, Inc. — by throwing its hat into the ring with its EXL 316 — lends credibility to the field and offers users a large, established vendor.

"Prime sort of bit the bullet and put out a machine that could wipe out some of its other low-end products," says Richard Mikita of International Data Corp. in Framingham, Mass. In addition to lending the name of an established company, Prime will offer remote diagnostics with the system, points out John Logan of The Yankee Group, based in Boston. The Prime 386 machine uses Merge 386, a Unix operating system that can also run MS-DOS.

Other big hats

Elsewhere, Texas Instruments, Inc.'s System 1300 fits into TI's existing line of multiuser configurations that the company sells through VARs. The System 1300 sits between the System 1100 and the System 1500, the latter of which can handle up to 125 users. Using the 20-MHz version of the 80386 chip, the system can bring 4 MIPS of processing power — after operating system overhead — to 32 users, according to TI.

> "THE sales leader appears to be Altos, which has shipped several hundred systems."
>
> JOHN LOGAN
> THE YANKEE GROUP

The company also says it is looking for the system to add to its installed base of health-care providers, banks and automotive dealerships.

In March, Fujitsu Microsystems of America, Inc. rolled out its System 2200 Model 50, part of its Pick-based Series 2000 line. The system has the benefit of the large library of business systems based on Pick Systems' operating system.

Also announced in March was the 16-MHz 80386-based Unisys B38, which runs BTOS, the former Burroughs multiuser, multitasking operating system. As an add-on feature, the B38 can run MS-DOS; a future version of the product is scheduled to be able to run both operating systems with no add-on necessary, according to Unisys.

The B38 fits into Unisys's B25 line of multiuser workstations. Clustershare, announced at the same time as the B38, allows personal computers running MS-DOS to operate in a BTOS cluster with any member of the B25 family. Originally offered to support 11 users, the B38 can now support up to 15, following the July release of BTOS 2.

The two B38 models, one of which includes an Intel 80287 math coprocessor, are manufactured by Convergent Technologies, Inc. Currently available, the Unisys system has the benefit of a large library of BTOS-based applications, particularly for state and local government, according to The Yankee Group's Logan.

Altos Computer Systems, Inc. announced in May its Altos 386 Series 2000, which runs Microsoft's Xenix System V operating system. Using the 16-MHz 80386 chip, the system is compatible with the company's current family of Intel 80286-based systems that run Xenix 3.0 and will reportedly run the same application software as the 80286-based systems. Stressing office automation applications, Altos hopes to sell its Altos Office Manager packages with the system, which will be distributed through Altos VARs, OEMs and systems integrators.

"The current sales leader appears to be Altos, which has shipped several hundred systems," Logan comments.

He points out that previous Altos systems, based on the Motorola, Inc. 68020 processor, were also multiuser offerings. He says Unix-based applications on the 68020 systems should translate readily to the 80386 systems.

Tandem Computers, Inc. and Allen-Bradley sell this computer under their own label, Logan adds, suggesting that it is highly probable that Tandem will resell the Altos 80386 product as well.

Reasons for success

Logan notes the similarities between the multiuser 386 systems — such as the fact that many support Ethernet, Unix and the small computer systems interface — asserting that this is a boon to developers. "If I were a software developer, I would write in C to be as portable as possible under Unix. If I were a VAR, I would take a vanilla-flavored machine and lead with it," he says.

For stand-alone applications in small businesses, Logan says a multiuser 386 system offers unexcelled price/performance. But to make the most of these systems, he says, the end user has to be creative and needs to understand his configuration and the application running on it. If he doesn't, "that could be an obstacle," Logan warns.

If the systems do well in the small business market, they could force IBM's hand in introducing a multiuser version of its PS/2 Model 80. However, Logan expresses doubt that IBM will introduce a multiuser 386 system soon — if ever. "IBM doesn't want a $25,000 box to compete with its other lines," he says.

In comparing the software libraries of various systems, Logan says the only vendor that does not already have a large library is Prime. The others have packages for their present systems that can be upgraded to run on the new 386 system.

Other side of the story

A pessimistic note about the future of 386-based multiuser systems is voiced by Brian Jeffery of International Technology Group in Los Altos, Calif.

"If you could port minicomputer small business applications to micros, you would do well. But there is not a large library in Unix," Jeffery says, adding that the small business market does not buy for performance alone. "The application is the most important thing. The multiuser micro market needs value added," he says.

Jeffery also adds that value-added resellers may balk at offering 386 systems. "A lot of people who sell minis don't want to sell multiuser micros. Their margin is too small," he says.

Jeffery adds that, despite its announced AIX for the PS/2 Model 80, IBM's multiuser PC will be a low-end 9370. He says IBM has indicated that it will provide a path from the PS/2 to the 9370, and this, he says, fuels his belief that the Model 80 will be the same thing as a 9370 Model 20. He also asserts the PS/2's Micro Channel will be used to cluster PS/2s.

"IBM will allow you to make the PS/2 Model 80 an SSP or VM machine before it introduces the multiuser version of OS/2 it is planning to develop with Microsoft," Jeffery predicts.

Looking ahead, more users will probably jump on the DEC bandwagon by moving to the Microvax 3000 in the next year. IBM may well recover its majority market share, having already frozen the sizable slice of the market pie that is inclined to buy from Big Blue.

The 386-based small business systems appear to be a sure bet to increase their own stake as well. The question of "who will be on first" a year from now should prove intriguing. •

Which IBM machine aims to kill the VAX?

Given the IBM 9370's high-profile publicity, which now includes the same former "M*A*S*H" television actors who appear in IBM's Personal System/2 advertisements, many observers have leapt to the conclusion that the mid-range processor is IBM's intended "VAX killer."

But, a few cognoscenti maintain that the product IBM publicly calls the "System/3X follow-on," which is also referred to as Silverlake, will be at least as important as the 9370 as a weapon in the arsenal against Digital Equipment Corp.'s VAX.

"There is no 'VAX killer' strategy; there is a 'VAX killers' strategy," says David Andrews, president of ADM, Inc. in Cheshire, Conn., a System/38 consulting firm.

He explains that the 9370 is aimed at departments of large customers that are already using IBM mainframes. As such, the 9370 represents only a defensive counterpunch against the inroads that VAXs, Wang Laboratories, Inc. VS processors, Hewlett-Packard Co. products and other minicomputers have made.

"If you don't already have a 370 structure in place, it is hideously expensive to put it in place. But if you have it in place, the cost of supporting one more 370 is relatively low," Andrews explains.

In contrast, Silverlake will be sold primarily to new users. Consequently, it will carry the ball in IBM's drive to put DEC on the defensive, Andrews maintains.

"Senior IBM managers have made it clear that Silverlake will be the preferred product," Andrews points out. Because Silverlake will combine the ease of use of the System/36 with the data base capabilities of the System/38, it will make a great deal of power available to new, relatively unsophisticated users.

Until now, the System/36 and 38 have been competing but, relative to DEC, have been weak in communications and office automation, according to Andrews. But a new generation of office automation software is also on the horizon, he adds. That, combined with the merged System/36 and 38, which will boast some of the strong points of each, will be a formidable offering.

"The relational data base that is part of the operating system of the System/38 is a huge advantage in the commercial marketplace. All others must add a relational capability as a layer of software. It's the commercial market that IBM wants DEC the hell out of. It's Silverlake they will use to get them out of it," Andrews states.

STANLEY GIBSON

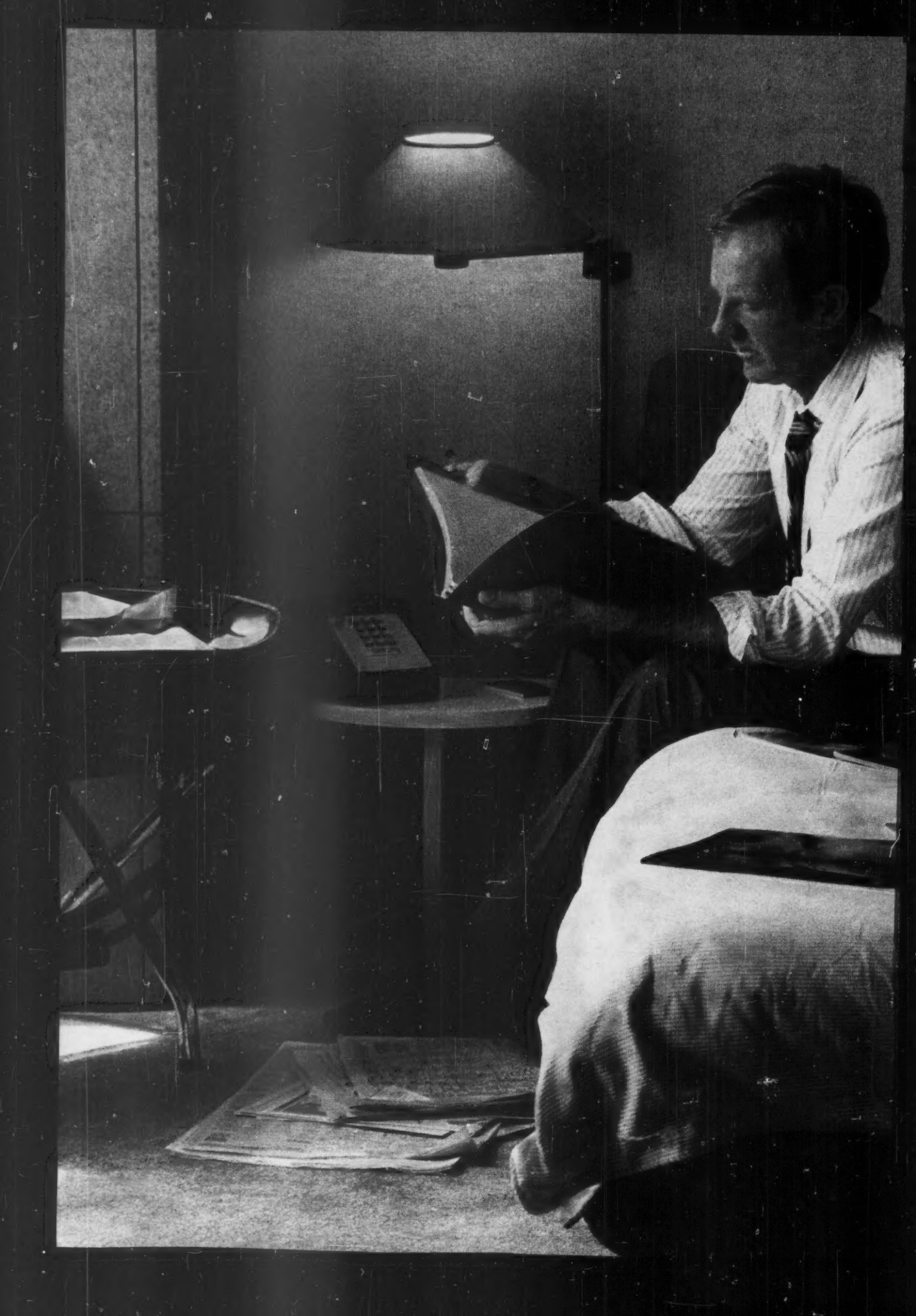
Hardware Roundup: Small systems

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
AT&T **Contact local sales office**	6386 series	Oct. 1987	DP, OA	NA	NA	16-20 MHz	1-64	NA	270M	NA	Unix System V, MS-DOS	32	NA	32	$4,899
	3B2/310	First quarter 1984	DP, OA	System/36 Model 5362, Microvax II	0.6	138.9 nsec	1-4	5M bit/sec.	NA	18	Unix System V	18	6-10	32	$12,845 with 1M-byte memory
	3B2/400	Second quarter 1985	DP, OA	System/36 Model 5362, Microvax II	1.1	100 nsec	1-4	5M bit/sec.	NA	46	Unix System V	46	15-25	32	$20,845 with 1M-byte memory
	3B2/500	NA	DP, OA	NA	2.1	NA	4-8	NA	14.4G	50	Unix System V	50	25-40	32	$28,000 with 4M-byte memory, 10 ports, 147M-byte disk
	3B2/600	March 1987	OA	Microvax II, System/36	2.6	143.7 nsec	4-16	NA	720M	90	Unix System V	64	25-64	32	$46,500 with 4M-byte memory, 2 147M-byte hard disks, tape drive
Alpha Microsystems, Inc. **(714) 641-6280**	AM-1200	Jan. 1987	OA	Microvax	NA	100 nsec	1-4	5	20M-58M	6-13	AMOS	13	7-10	16	$4,795 with CPU, 1M-byte memory, 20M-byte disk, 6 ports
	AM-1500-06	Nov. 1985	OA	VAX	NA	100 nsec	1-16	5	70M-300M	6-30	AMOS	30	20	16	$15,050 with CPU, 1M-byte memory, 70M-byte disk, 6 ports
	AM-1500-10	Nov. 1985	OA	VAX	NA	100 nsec	1-16	12	70M-3.2G	6-120	AMOS	120	50	16	$31,485 with CPU, 2M-byte memory, 150M-byte disk, 6 ports
	AM-2000-06	May 1986	OA	VAX	NA	60 nsec	1-20	5	70M-300M	6-30	AMOS	30	25	32	$29,000 with CPU, 4M-byte memory, 70M-byte disk, 6 ports
	AM-2000-10	May 1986	OA	VAX	NA	60 nsec	1-36	12	70M-3.2G	6-240	AMOS	240	75	32	$54,940 with CPU, 4M-byte memory, 400M-byte disk, 6 ports
Altos Computer Systems, Inc. **(800) 258-6787**	Altos 1086	Oct. 1985	OA	Microvax II, System/ 36	1.5	660 nsec	2-8	5	50M-80M	10	Xenix 3.0	10	6-10	16	$11,995 with 2M-byte memory, terminal, 50M-byte disk, tape
	Altos 2086	June 1985	OA	Microvax II, System/36	1.5	660 nsec	4-8	5	80M-190M	20	Xenix 3.0	20	10-20	16	$17,995 with 4M-byte memory, terminal, 80M-byte disk, tape
Applied Digital Data Systems, Inc. **(516) 231-5400**	Mentor 6000 Model 2	Feb. 1987	DP	System/36	1	60 nsec	1-4	5M bit/sec.	85M-140M	8-32	Enhanced Pick	32	12	32	$24,000 with 85M-byte disk, 1 parallel printer, 8 ports, tape
	Mentor 6000 Model 4	Sept. 1986	DP	System/36, 38	2	60 nsec	2-8	5M bit/sec.	140M-280M	8-96	Enhanced Pick	96	24	32	$41,000 with 4M-byte memory, tape, 140M-byte disk, 2 parallel printers
	Mentor 6000 Model 6	Sept. 1986	DP	9370 Model 60, System/38	2	60 nsec	2-8	5M-10M bit/sec.	284M-968M	16-112	Enhanced Pick	112	40	32	$84,000 with 2M-byte memory, 48M-byte disk, 2 parallel printers, tape, 32 ports
	Mentor 6000 Model 8	Sept. 1986	SE	NA	2	60 nsec	4-16	5M-15M bit/sec.	655M-4.5G	16-160	Enhanced Pick	160	80	32	$152,000 with 8M-byte memory, 64 ports, 655M-byte disk, tape, 2 parallel printers
Arete Systems Corp. **(408) 432-1200, ext. 477**	Arete System 800 (1 or 2 CPUs)	May 1987	DP, OA	NA	2.5-5	125 nsec	4-16	240K	5.5G	40	Unix System V.2.2	40	24-40	32	$29,950 with CPU, 4M-byte memory, controller, 170M-byte disk
	Arete System 1200 (1-4 CPUs)	Dec. 1983	DP, OA	NA	2.5-10	125 nsec	2-16	240K	10G	88	Unix System V.2.2	88	40-64	32	$52,950 with CPU, 4M-byte memory, controller, 168M-byte drive, tape
AT&T **Contact local sales office**	AT&T 3B2/310	First quarter 1984	DP, OA	System/36 Model 5362, Microvax II	0.6	138.9 nsec	1-4	5M bit/sec.	NA	18	Unix System V	18	6-10	32	$9,500 with 1M byte memory
Bytronix Corp. **(714) 634-4949**	Mikron 600	1982	OA	NA	1.7	600 nsec	Up to 2	10	380M	20	Blis, Cobol, Iris, Bits	18	8	16	$10,000 with 128K-byte memory, operating system
	Mikron 400	1982	OA	NA	2.5	400 nsec	Up to 2	10	380M	20	Blis, Cobol, Iris, Bits	18	8	16	$10,000 with 128M-byte memory, disk drive
Celerity Computing **(800) 443-9940,** **(800) 433-4481 (Calif.)**	C1200	Nov. 1984	SE	VAX 8300	8	125 nsec	2-24	2.3	1G	64	Unix 4.3	64	40	32	$50,000 with CPU, 4M-byte memory, disk, operating system

* *Computerworld* estimates based on vendor-supplied information.
[1]Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2]Unisys uses data link processors in place of conventional ports on this system.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Charles River Data Systems (617) 626-1000	Universe/200 (1-4 CPUs)	June 1986	SE, TP	NA	2-12	10 MHz	1-2	12	3.2G	4-32	UNOS	32	12-16	32	$7,995 with CPU, 1M-byte memory, 26M-byte drive, 1.2M-byte floppy
	Universe/400 (1-4 CPUs)	June 1986	SE, TP	NA	2-12	12.5 MHz (68000), 16.7 MHz (68020)	1-16	15	3.2G	4-64	UNOS	64	16-32	32	$12,900 with CPU, 1M-byte memory, 26M-byte disk, 1.2M-byte floppy
	Universe/600 (1-4 CPUs)	June 1986	SE, TP	NA	2-12	12.5 MHz (68000), 16.7 MHz (68020)	1-16	15	3.2G	4-96	UNOS	96	16-32	32	$26,400 with CPU, 1M-byte memory, 2M-byte disk, 1.2M-byte floppy
	Universe 68 (1-4 CPUs)	1981	SE, TP	NA	2-12	12.5 MHz	1-12	15	400M	4-64	UNOS	64	16-32	32	$16,700 with CPU, 1M-byte memory, 40M-byte disk
	Universe 32 (1-4 CPUs)	1984	SE, TP	NA	2-12	12.5 MHz	1-16	15	1G	4-64	UNOS	64	32	32	$23,200 with CPU, 1M-byte memory, 40M-byte disk
CIE Systems, Inc. (714) 660-1800	680/50	July 1987	DP	NA	2	16 MHz	1-8	600K	53M	3-16	Pick, RM COS, Unix	32	8	32	$10,130 with operating system
	680/250	June 1986	DP	NA	NA	16 MHz	1-8	2.5	168M-1.7G	16-128	Pick, RM COS	128	50	32	$36,615 with operating system
	680/550	July 1987	DP	NA	5	25 MHz	4-8	2.5	690M-2.7G	32-250	Pick, RM/COS	250	90	32	$128,995 with operating system
Computer Consoles, Inc. (800) 345-1942, (800) 237-4552 (Calif.)	Power 5/32	Jan. 1986	OA	Microvax II	1.5	80 nsec	2-4	5M bit/sec.	300M	30	CCI System V	16	12	16	$26,900 with CPU, 4M-byte memory, 150M-byte disk, 10-user Unix license
	Power 5/32X	Fourth quarter 1987	OA	Microvax II	2.5	80 nsec	4-16	10M bit/sec.	600M	48	CCI System V	32	24	32	$38,000 with 3 CPUs, 4M-byte memory, 140M-byte disk, 16-user Unix license
Computer Designed Systems, Inc. (612) 545-2855	Adviser 25 series	1977	DP	System/36, 38, Microvax, VAX	1.2-14.6	25-75 nsec	1-123	9-120	40M-19.2G	4-256	AVOS/Unix, DOS	256	35-80	16-64	$13,600 with 1M-byte memory, 40M-byte disk, power supply
Concurrent Computer Corp. (800) 631-2154	3205	1984	DP, SE, TP	Microvax	0.4	400 nsec	500K-4M	1.2	1G	1	OS/32, Xelos	24	16	32	$19,500 with 2M-byte memory
	3203	1985	DP, SE, TP	Microvax	0.4	400 nsec	512K-4M	1.2	364M	1	OS/32, Xelos	16	8	32	$27,500 with 2M-byte memory, 182M-byte disk
	3212	1986	DP, SE, TP	VAX 8250	1	260 nsec	4-16	3	300G	8	OS/32, Xelos	64	32	32	$42,000 with 4M-byte memory
Convergent Technologies, Inc. (408) 434-2848	S/120	April 1987	DP	Micro PDP-11/83	2	320 nsec	1-5	5M bit/sec.	50M-380M	12	Unix V.2, V.3	12	6-12	32	$12,000 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/221	June 1987	DP	Microvax II	2	320 nsec	1-5	5M bit/sec.	50M-570M	22	Unix V.2, V.3	32	12-22	32	$14,000 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/222	June 1987	DP	VAX 8250	2	320 nsec	1-5	5M bit/sec.	50M-1.4G	22	Unix V.2, V.3	32	12-22	32	$15,500 with 1M-byte memory, 150M-byte disk, power supply, operating system
	S/320	Oct. 1985	DP	VAX 8350	2	320 nsec	1-16	5M-24M bit/sec.	50M-1G	42	Unix V.2, V.3	32	16	32	$16,500 with 1M-byte memory, 50M-byte disk, power supply, operating system
	S/640	Aug. 1987	DP	VAX 8530	4.25	200 nsec	2-64	Up to 3	85M-4G	42	Unix V.2, V.3	64	32	32	$36,500 with 2M-byte memory, 85M-byte disk, power supply, operating system
Counterpoint Computers, Inc. (408) 434-0190	System 19K (1-8 CPUs)	Sept. 1985	DP, OA, TP	VAX	3-16	180-420 nsec	3-5	1.25	3G	96	Unix V.3	96	6-64	32	$14,850 with CPU, 2M-byte memory, 80M-byte disk, power supply, operating system
Cromemco, Inc. (415) 964-7400	CS120/150 Desktop	July 1986	SE	Microvax II	4	180 nsec	2-8	15M bit/sec.	750M	17	Unix V.2, CromixIX Plus	16	8	32	$16,995 with 2M-byte memory, 57M-byte disk, 2 390K-byte floppy disks
	CS220/250	Oct. 1986	SE	Microvax II	4	180 nsec	2-16	15M bit/sec.	750M	65	Unix V.2, Cromix Plus	64	32	32	$26,995 with 2M-byte memory, 57M-byte disk, 2 390K-byte floppy disks
	CS420/450 Tower	June 1986	SE	Microvax II	4	180 nsec	2-16	15M bit/sec.	1.5G	9-65	Unix V.2, Cromix Plus	64	32	32	$27,995 with 2M-byte memory, 50M-byte disk, 1.4M-byte floppy disk, tape
Data General Corp. (617) 366-8911	MV/1400 DC	1987	DP, SE, OA, TP	Microvax 2000	1	160 nsec	4-8	5M bit/sec.	160M	10	AOS/VS, DG/UX	8	2-5	32	$9,995 with 4M-byte memory, 38M-byte hard disk, 737K-byte floppy, operating system
	MV/2000 DC	Nov. 1985	DP, SE, OA	Microvax II	1	160 nsec	4-12	5M bit/sec.	320M	24	AOS/VS, DG/UX	24	8-20	32	$19,150 with 4M-byte memory, 38M-byte hard disk, 737K-byte floppy disk, operating system
	MV/7800	1986	DP, SE, OA, TP	VAX 8250, Microvax II	1.06	320 nsec	Up to 14	2.2M	NA	128	AOS/VS, AOS/RT 32, DG/UX	64	20-50	32	$19,050 with 2M-byte memory, power supply, operating system
	MV/7800 XP	1987	DP, SE, OA, TP	VAX 8250, 9375	1.6	220 nsec	2-14	5M bit/sec.	9.4G	80	AOS/VS, DG/UX	80	20-64	32	$23,000 with 2M-byte memory, operating system
	MV/7800 DC	1986	DP, SE, OA, TP	Microvax II	1	320 nsec	2-14	5M bit/sec.	2.7G	48	AOS/VS, DG/UX	40	20-35	32	$28,400 with 2M-byte memory, 70M-byte disk, 737K-byte floppy disk, power supply
	MV/7800 DCX	Aug. 1987	DP	VAX 8250, 9375 Model 40	1.6	220 nsec	2-14	5M bit/sec.	2.7G	48	AOS/VS, DG/UX	40	20-35	32	$33,300 with 2M-byte memory, 70M-byte disk, operating system



"After ten years of trade shows, you figure any real news about 3270s is going to come from IBM. Then somebody hands you a spec sheet that changes everything.

I can see he's excited, but all he says is, 'You won't believe this.' It seems that what IBM didn't do—AT&T's been doing for a year. Namely, connecting Sync and Async environments. Now all our guys who need numbers from the VAX down the hall and the 3083 at corporate don't have to hop back and forth between displays. Now they can get the numbers they need to close a sale while they've got a customer on the line. Booth 16-B hadn't been real high on my list. AT&T's booth. Now here they are playing in IBM's park. And hitting home runs.*

AT&T comes through."

The AT&T 6500 Multifunction Communication System

Sync and Async support: Merges mainframe, mid-range and micro-computing environments in a single controller.

*IBM** 3270 functionality:* SNA/SDLC, BSC, Protocol Conversion, X.25, others.

Multi-host connectivity: Links up to three 3270 hosts and 32 Async processors, PCs or displays.

True windowing: Multiple concurrent session capability through four live windows.

Modular expansion permits feature-driven system migration.

To learn how AT&T packs so much into one system, or to arrange a demonstration, call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

*VAX is a trademark of Digital Equipment Corp.
**IBM is a registered trademark of International Business Machines Corp.
©1987 AT&T

AT&T
The right choice.

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Datamedia Corp. (603) 886-1570	DMC/932 Model 1630	NA	OA	Microvax	NA	150 nsec	1-12	5	65M-380M	6-32	Unix V.2	32	6	32	$11,500 with CPU, 1M-byte memory, 65M-byte disk, operating system
	DMC/932 Model 2610	NA	OA	Microvax	NA	120 nsec	2-16	20	65M-380M	6-32	Unix V.2	32	16	32	$15,500 with 1M-byte memory, 65M-byte disk, operating system
	DMC/932 Model 2620	NA	OA	Microvax	NA	120 nsec	2-16	20	380M	6-32	Unix V.2	32	24	32	$21,000 with CPU, 2M-byte memory, 170M-byte disk, operating system
	DMC/932 Model 2660	NA	OA	Microvax	NA	120 nsec	4-16	20	380M	6-32	Unix V.2	32	32	32	$29,000 with CPU, 4M-byte memory, 380M-byte disk, operating system
Datapoint Corp. (512) 699-7000	Model 7600	May 1986	DP, OA, TP	VAX 11/730	3.1	160 nsec	2-4	NA	NA	1	DOS, RMS	7	1-3	16	$3,995 with 2M-byte memory, 1 port
	8665 (turbo) processor system	July 1987	DP, OA, TP	VAX 11/750	2.67	125 nsec	1-4	750K	780M	24	DOS, RMS	24	4-12	8	$13,500 with 65M-byte disk, tape, 1M-byte memory
Digital Equipment Corp. Contact local sales office	Micro PDP-11 series	1982	DP	NA	NA	15 MHz	1.5-4	1.3	NA	NA	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix, RSX-11, RSX-11S	NA	NA	16	$14,000
	PDP-11 series	1970	DP	NA	NA	18 MHz	Up to 4	1.3	NA	NA	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix, RSX-11, RSX-11S	NA	Up to 48	16	$16,000
	Microvax 2000	1987	DP	NA	0.9*	NA	4-6	NA	142M	NA	VMS, Ultrix	20	4	32	$14,800 with 4M-byte memory, 38M-byte disk
	Microvax II	1985	DP	NA	0.9*	NA	1-5	625K	NA	NA	VMS, Ultrix	33	NA	32	$18,400 with 2M-byte memory
	Microvax 3500	NA	DP	9370 Model 60	3*	90	16-32	1.4	560M	NA	VMS, Ultrix-32	NA	NA	32	$74,800 with 16M-byte memory, Ethernet, 280M-byte disk, tape, operating system
	Microvax 3600	NA	DP	9370 Model 60	3*	90	32	2.2	1.8G	NA	VMS, Ultrix-32	NA	60	32	$99,800 with 32M-byte memory, Ethernet, 622M-byte disk, tape, operating system
	VAX 8250	1987	DP	NA	1.2*	NA	16-128	1	NA	NA	VMS, Ultrix	64	32	32	$92,000 with 16M-byte memory, operating system
Fortune Systems/SCI Technology, Inc. (415) 593-9000	Fortune Formula 4000	June 1987	DP, OA, TP	Microvax II	2	NA	1-4	1M-10M bit/sec.	40M-145M	4	Unix System V, For:Pro	20	10	32	$9,900 with 1M-byte memory, 40M-byte disk, 800K-byte floppy, operating system
	Fortune Formula 8000	Oct. 1986	DP, SE, OA, TP	Microvax II	2	NA	1-64	5M-10M bit/sec.	85M-145M	4	Unix System V, For:Pro	28	16	32	$21,900 with 1M-byte memory, 85M-byte disk, 800K-byte floppy, operating system
Fujitsu Microsystems of America, Inc. (408) 434-1160	System 2000	Oct. 1985	DP, SE, OA	NA	NA	NA	128K-1M	NA	26-86	1-8	Pick	8	4	NA	$8,250 with 128K-byte memory, 86M-byte disk, 2 ports, operating system
	System 2020	March 1986	DP, SE, OA	NA	NA	NA	512K-1M	NA	54-86	1-20	Pick	20	8-16	NA	$9,740 with 512K-byte memory, 86M-byte disk, 2 ports, operating system
	System 2200 Model 50	June 1987	DP, SE, OA	NA	NA	NA	2-4	NA	171-513	8-32	Pick	32	16-24	NA	$19,750 with CPU, 2M-byte memory, 171M-byte disk, 8 ports, tape, operating system
	System 2400 Model 50	Sept. 1987	DP, SE, OA	NA	NA	NA	2-8	NA	171M-1G	16-64	Pick	64	24-48	NA	$35,000 with CPU, 2M-byte memory, 171M-byte disk, 16 ports, tape, power supply, operating system
General Automation, Inc. (714) 778-4800	Zebra 1350	Feb. 1986	TP	NA	NA	10 MHz	512K-1M	5	67M	6-12	Pick with Zebra enhancements	12	4	16-32	$8,300 with 512K-byte memory, 20M-byte disk, tape, 6 ports, power supply
	Zebra 1750	March 1985	TP	NA	NA	12.5 MHz	1-2	5	420M	6-30	Pick with Zebra enhancements	30	12	16-32	$16,600 with 1M-byte memory, 47M-byte disk, tape, 6 ports, power supply
	Parallel Model 300XR	June 1984	DP	NA	0.7	100 nsec	1-8	900K	10.6G	8-32	Unix	32	5-25	16	$59,900 with 2 CPUs, 2M-byte memory, controller, 187M-byte disk, power supply, tape, 8 ports
	Parallel Model 500XR	Dec. 1986	DP	NA	2	60 nsec	2-4	1.25	10.6G	8-256	Unix	256	30-100	32	$77,300 with 2 CPUs, 2M-byte memory, 187M-byte disk, power supply, tape drive, 8 ports
Harris Corp. Computer Systems Division (800) 4HARRIS	MCX-3 Model 40	March 1986	SE	Microvax II	4.1	60 nsec	2-10	650K-1.2M	340M	4-12	Unix System V	32	2-12	32	$18,725 with CPU, 2M-byte memory, 650K-byte floppy, power supply, 4 ports
	MCX-3 Model 50	Feb. 1987	SE	Microvax II	4.1	60 nsec	2-16	650K-2.4M	690M	19	Unix System V	32	2-16	32	$24,500 with CPU, 2M-byte memory, 650K-byte floppy, power supply, 3 ports

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Hewlett-Packard Co. Contact local sales office	HP Micro 3000	1986	DP	NA	0.33*	NA	2-4	NA	2.2G	NA	MPE V	NA	4-16	16	$25,730 with 2M-byte memory, 81M-byte disk, operating system
	HP Micro 3000XE	1986	DP	Microvax II	0.42*	NA	2-8	NA	4.5G	NA	MPE V	NA	8-56	16	$57,500 with 2M-byte memory, 130M-byte disk, operating system
	HP 3000 Series 52	1986	DP	System/38	0.52*	NA	4-8	1	3.2G	92	MPE V/E	92	32-48	16	$45,000 with 4M-byte memory, 2 channels, operating system
Honeywell Bull, Inc. (800) 328-5111, ext. 9712	DPS 6 Plus 400 series	May 1987	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-1.8	NA	2-16	1.82	Up to 3.3G	Up to 64	HVS 6 Plus	48	12-36	32	$33,000 with CPU, 2M-byte memory, 4 ports
	DPS 6 Plus 410 series	July 1986	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-3.5	NA	4-16	1.82	3.3G	Up to 80	HVS 6 Plus	64	24-48	32	$57,000 wih CPU, 4M-byte memory, 4 ports
	DPS 6 Plus 420 series	July 1986	DP, OA, TP	System/38; VAX 8250, 8350, 8550	0.95-3.5	NA	8-64	1.82	6.6G	Up to 96	HVS 6 Plus	160	40-120	32	$93,000 with CPU, 8M-byte memory, 4 ports
Icon International, Inc. (801) 225-6888	Icon 2000	Jan. 1986	DP, TP	VAX-11/700 series	2.5	60 nsec	2-10	10M bit/sec.	360M	8-16	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick R83	16	8	32	$14,900 with 2.75M-byte memory, 86M-byte disk, tape, 8 ports, power supply
	Icon 3000	June 1987	DP, OA, TP	VAX 8600	4	50 nsec	6-32	10M bit/sec.	360M	16-64	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick Release 83	64	32	32	$31,500 with 6M-byte memory, 160M-byte disk, tape, 16 ports, power supply
	Icon 4000	Dec. 1987	DP, OA, TP	VAX 8600	4	50 nsec	6-280	20M bit/sec.	2G	32-128	Unix 4.2, Unix V.2, MS-DOS 3.2, Pick Release 83	128	64	32	$55,000 with 1M-byte memory, 160M-byte disk, tape, 32 ports, power supply
IBM Contact local sales office	System/36 Model 5364	Aug. 1985	DP, OA	NA	0.05*	NA	512K-1M	625K-1.25M	130M	2	IBM System Support Program (SSP)	64	NA	16	$5,995
	System/36 Model 5362	Jan. 1984	DP, OA	NA	0.20*	NA	256K-2M	1.25-2.5	720M	4	SSP	64	NA	16	$15,000-$25,000
	System/36 Model 5360	Aug. 1983	DP, OA	NA	0.35*	NA	256K-7M	1.5	1.4G	16	SSP	72	NA	16	$40,000-$100,000
Intel Corp. (503) 681-8080	System 310	Nov. 1983	SE, OA, TP	Microvax II	1.5	8 MHz	1-9	5M bit/sec.	20M-140M	2-16	IRMS 86, IRMX 286, Xenix 286	16	8	16	$25,845 with 2M-byte memory, 140M-byte disk, power supply, tape
	System 320	1987	SE, OA, TP	VAX	4	20 MHz	1-16	5M bit/sec.	80M-280M	16	IRMX 286, Xenix 286	16	8	32	$12,900 with 1M-byte memory, CPU, controller, floppy
LF Technologies (702) 883-7611	Cubix 2	Feb. 1987	DP, OA	PC AT, Microvax	1	250 nsec	2-8	7.5M bit/sec.	220M	8	Unix V.2	8	6	16	$9,995 with 50M-byte disk, tape, floppy, 2M-byte memory
	Cubix 3	Feb. 1987	DP, OA	PC AT, Microvax	1	250 nsec	2-8	7.5M bit/sec.	660M	16	Unix V.2	16	14	16	$12,995 with 50M-byte disk, tape, floppy, CPU, 2M-byte memory
MAI Basic Four, Inc. (714) 731-5100	MAI 2600	Feb. 1985	DP	NA	1	500 nsec	768K-1.5M	4	240M	18	BOSS/IX	18	6	16	$10,250 with 768K-byte memory, 44M-byte disk, 7 ports
	MAI 3000	Dec. 1986	DP	NA	2	187.5 nsec	1-6	NA	480M	34	BOSS/IX	34	20	32	$18,825 with 1M-byte memory, 44M-byte disk, 7 ports
	MPx 7100 series (1 or 2 CPUs)	Aug. 1985	DP, OA, TP	Microvax II, VAX 8250; System/36	NA	NA	2-6	630	NA	52	BOSS/VS	52	20	16-32	$26,999 with CPU, 2M-byte memory, 4 ports, 169M-byte disk, tape
MDS Qantel, Inc. (415) 887-7777	System 43/45	1987	TP	NA	NA	77 nsec	512K-1M	NA	NA	4	BEST/AOS	32	8	8	$13,450 with CPU, 512K-byte memory, 45M-byte disk, operating system
	System 45XP/75	1987	TP	System/36	NA	77 nsec	512K-1M	NA	NA	8	BEST/AOS	32	8-10	8	$20,950 with CPU, 512K-byte memory, 75M-byte disk, operating system
	System 55/160	Feb. 1986	TP	System/36	NA	71.4 nsec	2-4	NA	NA	8	BEST/AOS	64	20	8	$25,950 with CPU, 2M-byte memory, 160M-byte disk
	System 58	Feb. 1986	TP	System/36	NA	71.4 nsec	2-16	NA	NA	14	BEST/AOS	64	20	8	$24,950 with CPU, 2M-byte memory
	System 78	March 1986	TP	System/38	NA	50 nsec	2-16	NA	NA	16	BEST/AOS	150	40-50	8	$59,950 with CPU, 2M-byte memory
MIPS Computer Systems, Inc. (415) 720-1700	M/500 System	June 1986	SE	VAX 8600	5	125 nsec	4-20	2.4	170M-689M	8-32	UMIPS/V, UMIPS/BSD	32	1-32	32	$20,900 with 4M-byte memory
	M/800 System	March 1987	SE	VAX 8700	8	80 nsec	4-20	2.4	170M-689M	8-32	UMIPS/V, UMIPS/BSD	32	1-32	32	$25,900 with 4M-byte memory
	M/1000 System	July 1987	SE	VAX 8800	10	66.7 nsec	4-80	2.4	170M-689M	8-32	UMIPS/V, UMIPS/-BSD	32	1-32	32	$35,900 with 4M-byte memory
McDonnell Douglas Computer Systems Co. (714) 250-1000	M6000 series	1985	DP, OA	System/36, Microvax II	NA	300 nsec	512K-4M	12M bit/sec.	47M-485M	8-64	Reality	64	16-32	16	$23,500 with 512K-byte memory, 47M-byte disk, 8 ports, tape

With only one copy of Computerworld per department, security is extremely tight.

The more valuable a publication, the more important it is to have your own copy.

That's why we're offering you your own subscription to COMPUTERWORLD for just 76¢ an issue.

A week's worth of news for 76¢.

That's right. For just 76¢ an issue, you can find out what you need to know. When you need to know it.

You'll see what products breakthrough. And what products break down. You'll get the news and views of the industry. And the ads and advice of its leaders.

In fact, with COMPUTERWORLD on top of your desk, you'll be on top of your job.

And there's more...

In addition to your 51 issues of COMPUTERWORLD, you'll get – absolutely FREE...

- 12 issues of COMPUTERWORLD FOCUS – an in-depth exploration of a single critical topic each month: communications, data security, PCs, Information Centers...
- Our special Spotlight section twice a month. Head-to-head product comparisons with an at-a-glance ratings chart. Security products, LANs, graphics workstations,...a different product in each issue.

Call today. And stop waiting in line.

1-800-255-6286
(in NJ call 1-800-322-6286)

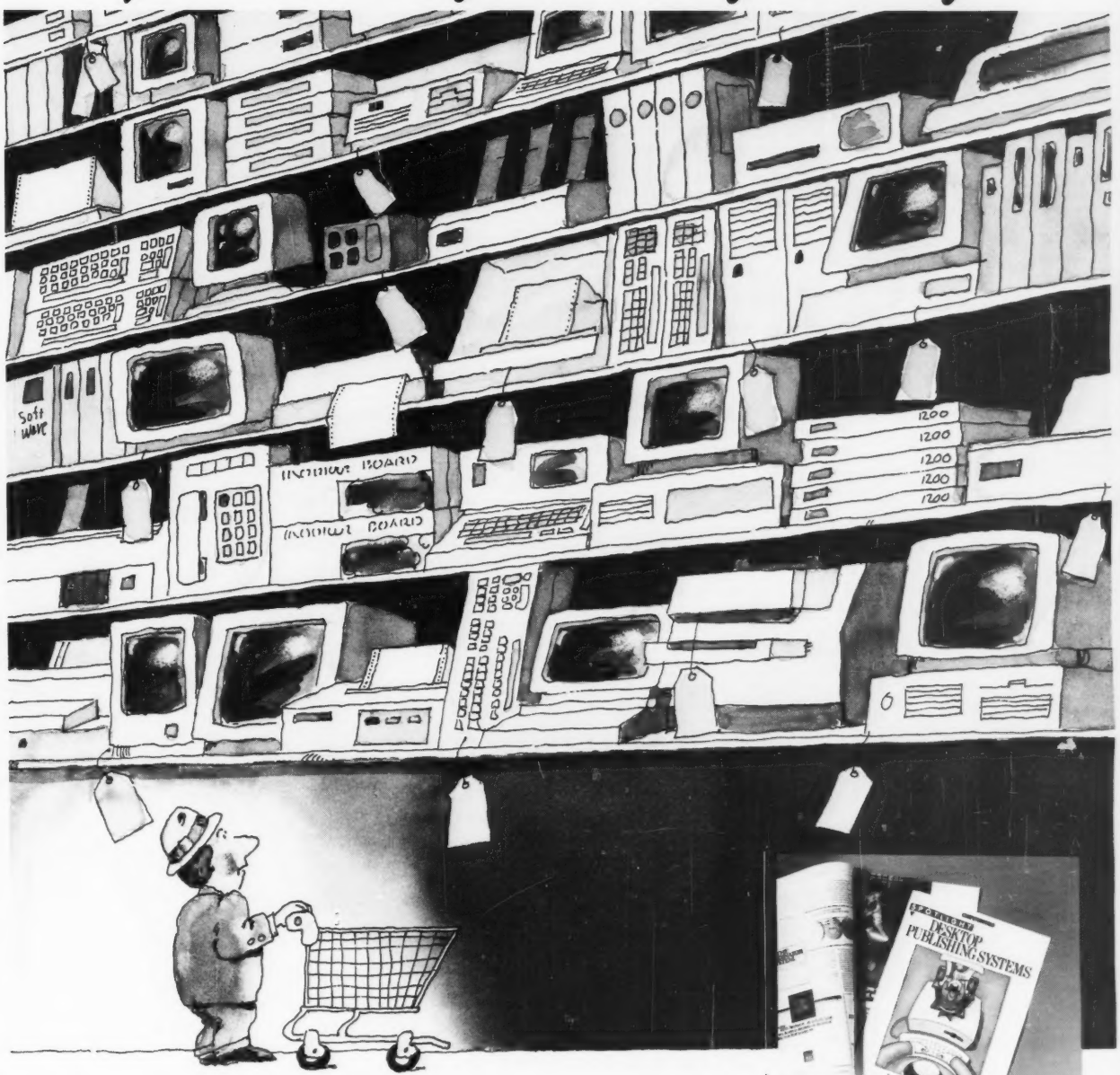
COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Modular Computer Systems, Inc. (305) 974-1380	Classic II/15	1984	SE	NA	0.2	400 nsec	Up to 2	NA	NA	NA	MAX IV	16	NA	NA	$13,500 with 512K-byte memory
	Classic II/25	1982	SE	NA	0.3	250 nsec	128K-1M	NA	NA	NA	MAX IV	64	NA	16	$27,300 with 512K-byte memory
	Classic II/45	1982	SE	NA	0.7	250 nsec	Up to 2	NA	NA	NA	MAX IV	128	NA	16	$40,000 with 1M-byte memory
	Power 45	1987	SE	NA	0.7	250 nsec	Up to 2	5	NA	NA	MAX IV	128	NA	16	$72,800 with 2M-byte memory, 166M-byte disk, tape
Motorola Computer Systems, Inc. Contact local sales office	System 8000 Model 100	NA	OA	Microvax 2000, PS/2 series	2.5	66 nsec	2-4	10M bit/sec.	161M	2-10	Unix V680S	8	1-8	32	$23,000
NCR Corp. Contact local sales office	Minitower	1985	DP	NA	0.5	10 MHz	1-2	NA	140M	8	Unix V.2, RM/COS	8	NA	16	$5,305 with 1M-byte memory, 25M-byte disk, floppy drive
	Tower XP	1984	DP	Microvax II, System/36	0.8	10 MHz	1-8	NA	280M	18	Unix V.2, RM/COS	16	2 to 16	16	$8,525 with 25M-byte disk, 1M-byte memory, floppy drive, operating system
	Tower 32/400	1986	DP	NA	2.1	16.7 MHz	1-8	NA	140M	18	Unix V.2	16	NA	32	$14,995 with 1M-byte memory, 46M-byte disk, tape, operating system
	Tower 32/600	1985	DP	NA	1	16.7 MHz	1-16	NA	5.5G	54	Unix V.2, RM/COS	48	NA	32	$21,175 with 1M-byte memory, 46M-byte disk, tape
NEC Information Systems, Inc. (617) 264-8000	Astra XL/32	Feb. 1986	DP	System/36, Microvax II with Ultrix	NA	16.7 MHz	2-16	1.2	1G	32	Unix V.2	32	20	32	$25,500 with 125M-byte disk, 2M-byte memory, 8 ports
	Astra 300 VS series	June 1984	DP	System/36, PDPs, Microvax II	NA	10 MHz	1-6	1.2	1G	34	Unix V.2	32	16	32	$26,000 with 125M-byte disk, 2M-byte memory
Norsk Data NA, Inc. (617) 366-4662	ND 110	NA	DP	Microvax	0.55	120 nsec	0.5-128	2.1	1.2M-8G	15	Sintran	128	NA	32	$97,150 with 1M-byte memory, 1.2M-byte disk, power supply, operating system
Onyx Technologies, Inc. (415) 651-0676	5010	1979	OA	NA	NA	NA	20-100	NA	160M	11	Oasis	8	5	16	$4,295 with 20M-byte disk, 384K-byte memory, tape, operating system, 5 ports
	5012	1979	OA	NA	NA	NA	50-170	NA	170M	11	Unix	8	5	16	$4,995 with 512K-byte memory, 5 ports, operating system
Plexus Computers, Inc. (408) 943-2248	Plexus P/90	June 1987	DP	VAX	4	25 MHz	2-16	2	3.5G	8-64	Unix System V	64	24	32	$29,500 with 2M-byte memory, 67M-byte disk, tape, power supply
	Plexus P/95	May 1987	DP	VAX 8600	4	25 MHz	4-48	3	6.7G	128	Unix System V	128	60	32	$55,000 with 4M-byte memory, 142M-byte disk, tape, power supply
Point 4 Data Corp. (714) 259-0777	Mark 2E	Jan. 1987	DP	System/36	3.6	280 nsec	Up to 2	0.625	27M-143M	17	Iris	19	12	16	$11,395 with 256K-byte memory, 4 ports, 27M-byte disk, 60M-byte tape, operating system
	Mark 4E	May 1987	DP	System/36	3.6	280 nsec	Up to 2	0.625	86M-429M	33	Iris	32	24	16	$21,995 with 1M-byte memory, 16 ports, 86M-byte disk, 60M-byte tape, operating system
Prime Computer, Inc. (800) 343-2540, (800) 322-2450 (Mass.)	EXL 316	June 1987	DP	Microvax II	3.2	16 MHz	2-8	1.25	1G	58	Prime SVID	32	NA	NA	$23,900 with 2M-byte memory, 60M-byte tape, 90M-byte disk, power supply, operating system
	2350	Feb. 1986	DP, SE, OA, TP	Microvax II, 9370 Model 20	0.85	160 nsec	2-8	1.5	516M	1	Primos	32	NA	32	$19,900 with 60M-byte tape, controller, power supply, operating system
	2450	Feb. 1986	DP, SE, OA, TP	Microvax II, 9370 Model 40	1.3	160 nsec	4-8	1.5	516M	1	Primos	40	NA	32	$43,560 with 60M-byte tape, controller, power supply, operating system
	2455	1987	DP	Microvax II	1.6	NA	4-12	NA	774M	40	Primos	40	NA	32	$62,810 with 4M-byte memory, 258M-byte disk, tape, operating system
Rexon Business Machines Corp. (800) 421-5184	Summit 1000	Dec. 1986	DP	PC AT	NA	100 nsec	640K-15M	5M bit/sec.	25M-191M	Up to 16	Pick Open Architecture, Xenix System V, Thoroughbred	16	8	16	$2,850 with 640K-byte memory, 25M-byte disk, 60M-byte tape
	Summit 2000	Aug. 1987	DP, OA	PS/2 Model 80	NA	62.5 nsec	1-24	5M bit/sec.	50M-191M	Up to 32	Pick Open Architecture, Xenix System V, Thoroughbred	32	16	32	$4,400 with 1M-byte memory, 50M-byte disk, 60M-byte tape
SCI Technology, Inc. (205) 882-4773	SCI 1000	Sept. 1983	OA	VAX-11/750	0.75	500 nsec	1	5M bit/sec.	172M	8	IN/ix 2.0	8	6	16	$11,900 with 1M-byte memory, 86M-byte disk, 500K-byte floppy
	SCI 2000	Oct. 1985	OA	VAX-11/785	2	250 nsec	2-8	5M bit/sec.	172M	24	IN/ix 2.0	24	12	16	$12,910 with 2M-byte memory, 86M-byte disk, 500K-byte floppy
	SCI 3000	June 1987	OA	VAX 8600	3.5	125 nsec	4-8	1.5M bit/sec.	344M	64	Unix V.3	64	34	32	$19,850 with 4M-byte memory, 86M-byte disk, 1.2M-byte floppy

COMPANY	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	CPU SPEED	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTE/SEC.)	DISK CAPACITY (BYTES)	PORTS	OPERATING SYSTEM	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Tandem Computers, Inc. (408) 726-6000	Tandem LXN	Jan. 1987	TP	System/36	NA	16.7 MHz	2-16	10M bit/sec.	1.02G	10	Unix V.2.2	32	18-24	32	$23,700 with 2M-byte memory, controllers, 60M-byte tape, 60M-byte hard-disk, 10 ports
	Nonstop CLX series (1-6 CPUs)	Fourth quarter 1987	TP	VAX 8350, 9370	1-6	133 nsec	12-72	1.2	9.8G	67-612	Guardian 90	67-612	50-300	32	$57,000 with CPU, 4M-byte memory, 2 14M-byte disk drives, tape, power supply
	Nonstop EXT10 (1-4 CPUs)	Aug. 1986	TP	System/36, 38	1.7-3.4	100 nsec	8-32	1.2	26G	144-288	Guardian 90	912	150	16	$74,900 with 2 CPUs, 8M-byte memory, 250M-byte disk, tape, power supplies
Texas Instruments, Inc. (800) 527-3500	System 1100	April 1987	DP	PS/2, Model 60	1.4	83 nsec	1-15	5M bit/sec.	48M-280M	8-24	TI System V	16	10-12	16	$13,895 with 1.15M-byte memory, 48M-byte disk, 60M-byte tape
	System 1300	Fourth quarter 1987	DP	PS/2 Model 80, Microvax II	4	50 nsec	4-64	10M bit/sec.	1.8G	16-32	TI System V	32	16-20	32	$27,495 with 4M-byte memory, 182M-byte hard disk, 60M-byte tape
Third Coast Technologies, Inc. (415) 570-4641	Taico 386	June 1987	DP	PC AT	3.5-4.3	50-62.5 MHz	2-16	450K	382M	17-25	Xenix, Unix V.3, Theos 286/386, MS-DOS	24	15	15	$8,895 with 17 ports, 2M-byte memory, 1.2M-byte floppy
	386V	Jan. 1986	DP	NA	3.5-4.2	50-62.5 MHz	4-16	800K	1.2G	32-64	Xenix V, Theos 286/386	64	25	32	$16,995 with 32 ports, 4M-byte memory
The Ultimate Corp. (201) 887-9222	Honeywell Model 1410	NA	OA	NA	NA	NA	2	NA	NA	8	Ultimate Operating System	NA	NA	32	$18,500 with 2M-byte memory, 8 ports, 86M-byte disk, power, operating system
	Honeywell Model 1420	NA	NA	DP	NA	NA	12	NA	NA	16	Ultimate Operating System	NA	NA	32	$31,000 with 2M-byte memory, 182M-byte disk, 16 ports, power, operating system
	Honeywell Model 1430	NA	NA	DP	NA	NA	2	NA	NA	32-64	Ultimate Operating System	NA	NA	32	$39,900 with 2M-byte memory, 182M-byte disk, 32 ports, power, operating system
Unisys Corp. (313) 972-7666	B38	March 1987	DP, OA, TP	System/36, Microvax II	NA	52.5	1-4	5	272M	2-10	BTOS, PC-DOS	64	12	16	$5,035 with 1M-byte memory, power, 4 ports
	5000/30	Oct. 1986	DP	System/36	NA	16.67 MHz	2-8	0.07	Up to 679M	8-16	Unix V.2	16	8	32	$14,900 with 2M-byte memory, 39M-byte disk, 8 ports, power supply, 45M-byte tape
	5000/50	May 1986	DP	System/36, Microvax II	NA	16.67 MHz	2-16	0.15	Up to 1.36G	8-32	Unix V.2	32	16	32	$22,135 with 2M-byte memory, 8 ports, 71M-byte disk, 45M-byte tape drive
	5000/70	Dec. 1984	DP	System/36, Microvax II	NA	16.67 MHz	1-36	1.2	Up to 3.5G	Up to 128	Centix	128	16-64	32	$27,000 with 5M-byte memory, 16 ports, 71M-byte disk, 4M-byte tape, power supply
	5000/90	June 1986	DP	System/36, 38; VAX 8200	NA	12.5 MHz	4-16	1.2	Up to 7G	Up to 128	Unix V.2	128	32-64	32	$68,300 with 2M-byte memory, 8 ports, 149M-byte disk, 45M-byte tape, power supply
	A 1	Sept. 1987	DP	9375 Model 40	0.5	NA	12-48	3.4	256K-1M	NA	MCP/AS	NA	10-25	48	$25,000 with CPU, 12M-byte memory
	A 2	April 1986	DP	System/38	0.35	NA	8-9	3	NA	8[2]	MCP/AS	NA	NA	48	$60,000 with 6M-byte memory, 125M-byte disk, tape, 2 data link processors
Wang Laboratories, Inc. (617) 459-5000	VS 5	April 1986	DP	NA	0.4*	480 nsec	1-2	1.2	1.7G	32	VS/OS	16	4-8	32	$13,000 with 1M-byte memory, 67M-byte disk, 16 ports
	VS 6	Apr. 1986	DP	NA	0.7*	200 nsec	1-4	1.2	1.7G	48	VS/OS	32	8-24	32	$22,000 with 1M-byte memory, 67M-byte disk, 16 ports
	VS 65	Feb. 1985	DP	NA	0.7*	200 nsec	1-4	1.2	2.6G	64	VS/OS	40	25-40	32	$30,000 with 2M-byte memory, 32 ports
Wicat Systems, Inc. (801) 224-6400	Wicat 2250	Sept. 1984	DP	VAX-11/780	1.25	NA	1-5	NA	182M	16	WMCS, Unix	16	8	16	$20,000 with 3M-byte memory, 86M-byte disk, 90M-byte tape, 8 ports, operating system
	Wicat 3220	Jan. 1987	DP	VAX-11/780	4	NA	4-12	NA	500M	64	WMCS, Unix	64	32	32	$60,700 with 4M-byte memory, 500M-byte disk, 32 ports, operating system
Zilog, Inc. (408) 370-8000	System 8000/32 Model 110	1986	DP	NA	4	56 nsec	2-8	10M bit/sec.	85M	Up to 26	Unix V.2.1	26	16	32	$17,450 with operating system, 10 ports, 2M-byte memory, 60M-byte tape, 85M-byte disk
	System 8000/32 Model 130	1986	DP	NA	4	56 nsec	2-16	20M bit/sec.	337M	Up to 58	Unix V.2.1	58	32	32	$37,900 with 4M-byte memory, operating system, 60M-byte tape

Reach potential customers just as they're ready to buy.



In SPOTLIGHT, the buyer's guide to the computer world.

Inside *Computerworld* these days, you'll find SPOTLIGHT. Each one a special "buyer's guide" covering features, prices and specs for every major offering in a given product category.

For our readers, SPOTLIGHT provides a unique feature-by-feature tabulated product comparison in a handy pullout section. A section they'll save for quick reference when they're ready to buy. Plus editorial covering technology trends, user reports and broad category overviews.

For our advertisers, it provides an opportunity to strike while the iron is hot. And reinforce sales messages at precisely the right moment. Just as buying decisions are being made.

So reserve your space in SPOTLIGHT now. And get your message across when it will do the most good. When the buyers are buying.

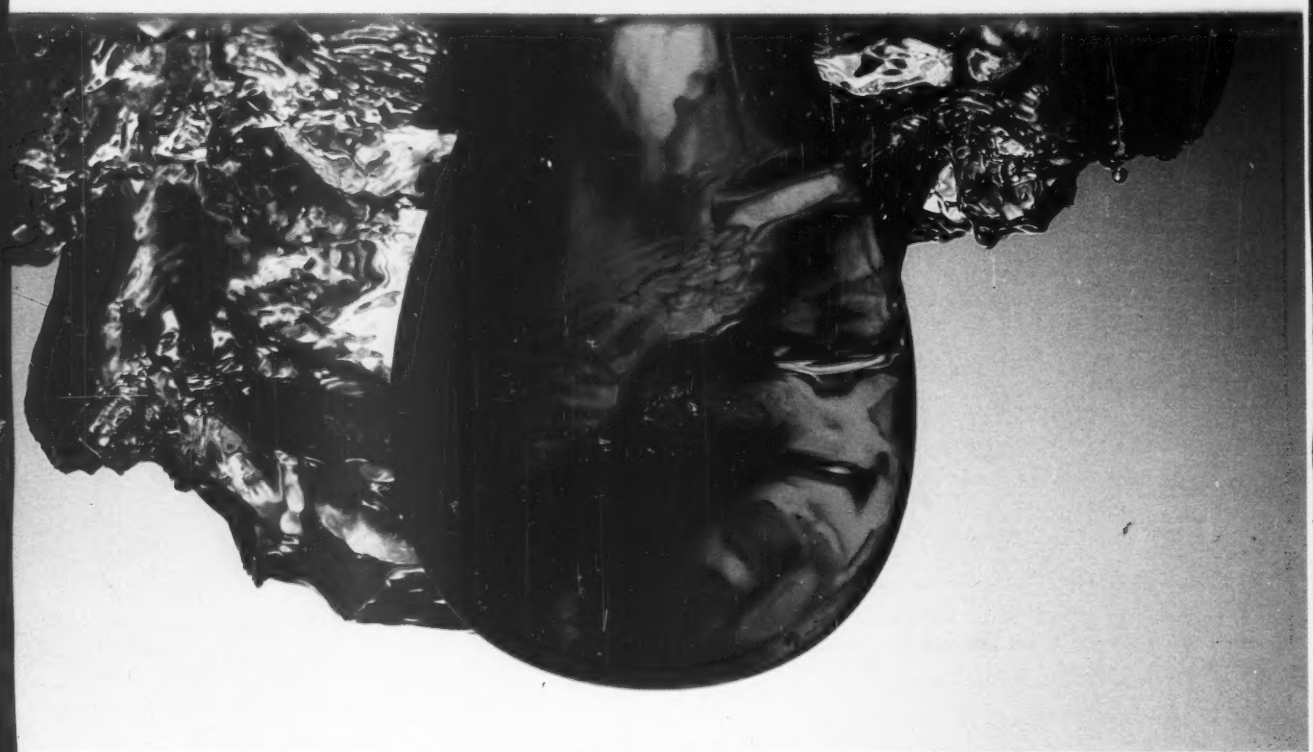
For more information, contact Ed Marecki, Vice President/Sales at (617) 879-0700, or call your local *Computerworld* sales representative.

COMPUTERWORLD
An IDG Communications Publication

Sales Offices:
Boston: (617) 879-0700 **New York:** (201) 967-1350 **Washington D.C.:** (703) 280-2027 **Atlanta:** (404) 394-0758
Chicago: (312) 827-4433 **Dallas:** (214) 233-0882 **Los Angeles:** (714) 261-1230 **San Francisco:** (415) 421-7330

Upcoming SPOTLIGHT Issues

Issue	Topic	Ad Closing Date
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
Oct. 26	Unix	Oct. 9
Nov. 2	The Macintosh Market	Oct. 16
Nov. 9	Application Development Tools	Oct. 23
Nov. 16	Communications	Oct. 30
Nov. 23	Artificial Intelligence	Nov. 6
Nov. 30	Power Protection Equipment	Nov. 13
Dec. 7	DEC-Compatible Hardware	Nov. 20
Dec. 14	Add-In Boards	Nov. 25
Dec. 21	Spreadsheets Software	Dec. 4



WITHOUT DATA GENERAL, INTEGRATING YOUR SYSTEMS IS LIKE MIXING OIL AND WATER.

FOR FULLY INTEGRATED BUSINESS AUTOMATION, TALK TO DATA GENERAL.

To maintain a competitive edge, a business needs to integrate all its resources. Ultimately blending people, departments, data and computer systems together.

Data General's Business Automation Systems integrate all these vital elements. Which gives your company one, accessible information flow.

Our industry-leading CEO® software gives you the most integrated business automation essentials. With spreadsheets. Graphics. Decision support. Tools that help you make faster, better informed business decisions.

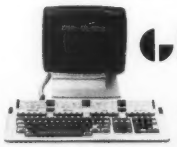
Then we take you further. By letting you integrate your existing applications.

Our communications story is second to none. We give you the most complete IBM compatibility. We also adhere to industry standards like Ethernet® and X.25.

So our business automation solutions integrate all levels of your company. From PC's to mainframes. And from the next room to the next continent.

Our MV/Family systems lead the industry in price/performance. And give you a low cost of ownership, along with service, training and support.

Today, over 165,000 CEO users have discovered true integrated business automation. To create the best possible blend for your business systems, talk to Data General. Call 1-800-DATAGEN (Canada call 1-800-268-5454.) Or write: Data General, 4400 Computer Drive, MS C-228, Westboro, MA 01580.



Data General
a Generation ahead.

©1987 Data General Corporation. CEO is a registered trademark of Data General Corporation. Ethernet is a registered trademark of Xerox Corporation.

Will China be the next Japan?

People's Republic finds U.S. technology transfer policy slows its push into an information economy

BY JOHN MAIER

First in a two-part series

While on a recent visit to China, a Westerner observed a Chinese store clerk using an abacus to total customers' bills rather than the electronic calculator that was also available to him. When asked why, the clerk replied that it was easier.

The point is that technology cannot merely be injected into a culture. Bringing more than one billion people into the electronic age must be a value-sensitive process — one that retains the culture's treasures.

This article discusses the convergence of the global information technology revolution with the emerging identity of the dynamic new China. In particular, I will examine the U.S. policy of computer technology transfer to China and the implications of that policy as it affects China's modernization drive. I will also share some of my experiences in China and my observations about the way computer technology is being diffused in Chinese economy and society.

The substance of this article results from a decade and a half of personal and professional involvement with China, including several years of living in Taiwan and mainland China and also five years of working in Washington, D.C., where I was often called in on matters relating to China.

In June I participated in the Second International Conference on Computers and Applications in Beijing, hosted by the Chinese Academy of Sciences Institute of Computing Technology and cosponsored by the China Computer Federation and the U.S. Institute of Electrical and Electronics Engineers.

I could not possibly encapsulate all of my experiences from trips to a country as complex as China, especially at a time when profound and widespread changes are occurring there, making it feel like spring all year round. While I appreciate my Chinese friends for what they taught and showed me, I saw some computer implementations that amazed me, some that confounded me and some that dismayed me.

There is always some level of tension in cross-cultural encounters. This is a serious issue, for we are talking about the technological impact on options for the future of a population almost twice as large as the combined populations of the U.S., Japan and the 10 countries of the European Economic Community.

Whereas the first internal-memory, stored-program computer was produced as a working model at Harvard University in 1944, it was more than a decade later — in 1958 — that China's first working computer prototype was announced by the Chinese Academy of Sciences Institute of Computing Technology.

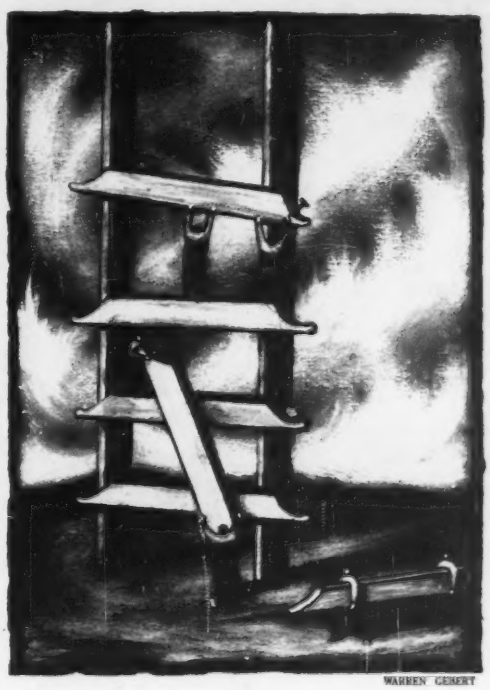
In that decade or so, the U.S. and some other Western countries had progressed from first-generation (tubes) to second-generation (transistors) technology and were about to produce a third (integrated circuits). The U.S. computer industry had emerged, and corporate giants — IBM, Honeywell, Inc., Sperry Univac and Burroughs Corp. — were vying for a growing domestic and international market, competing to produce the most current technologies to meet rapidly expanding demands. In 1958, as an embargoed country, China was excluded from that marketplace.

Behind from the first

China's first computer was a rather limited, first-generation machine. Its 32-bit processor, 4K bytes of internal memory and 180 operations per second speed reflected a traditional von Neumann architecture and stood two generations behind the technology then prevailing in the West. That machine and others were not put into serial production.

Although China progressed technologically through two more computer generations in the next two decades, it did not demonstrate large-scale production capabilities or diffuse, to any significant degree, computer technology into its economy or society. Computer activity in China was almost totally centered on the laboratory.

In the earlier years, from 1949 on, China was under a complete trade embargo imposed by Western countries, which



WARREN GEBERT

Maier is a computer scientist in Fort Worth, Texas. He is presently organizing the extension of a wide-area network with China. He recently founded the Systemic Threshold Advanced Research (STAR) Institute, a nonprofit international venue for research at disciplinary boundaries and thresholds.

- **Seeking parity with the West by year 2050**
- **Freer environment for transfer**
- **Computing with third-world power supply**

BUY THE NUMBERS.

There's only one way to make sure that you're buying a genuinely high-performance system and that's to evaluate the competition by the real numbers.

And when you compare Tandon's numbers against our major competition there's no doubt who's really selling the systems of the future.

	TARGA 20	PS/2 MODEL 30	TARGA 40 PLUS	PS/2 MODEL 50
1 PROCESSOR:	80286 6/8 Mhz dual speed	8086 8 Mhz	80286 8/10 Mhz dual speed	80286 10 Mhz
2 MEMORY: Standard Memory Management	1 MB Yes	640 KB No	1 MB Yes	1 MB No
3 DISK STORAGE: Capacity Effective access time	20 MB 85 ms	20 MB 85 ms	40 MB 35 ms	20 MB 85 ms
4 COMPATIBILITY: 5¼" floppy Runs OS/2	Yes Yes	No No	Yes Yes	No Yes
5 PRICE:	$1,999	$2,295	$2,995	$3,595

Take the excitingly priced Targa 20. Thanks to its powerful 80286 processor it dramatically outperforms the PS/2 model 30. And it supports Microsoft's OS/2, the operating system standard of the future.

Or put the Targa 40 up against their PS/2 model 50. Double the storage capacity, innovative disk cache technology, and a Tandon low price.

So whether you need a powerful system to help you manage your business, or else a high-performance file server at the heart of your network, the Tandon Targa is the ideal fit.

For more details on the powerful Tandon Targa family call: National **1-800-556-1234 ext. 171,** California **1-800-441-2345 ext. 171.**

Tandon

Price. Selection. Quality.

Please send me your Tandon Fact Pac, a comprehensive set of literature and product reviews:

Name _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Tandon Computer Corporation
405 Science Drive
Moorpark, CA 93021
(805) 378-6104

CW 9/28

PS/2 and OS/2 are registered trademarks of IBM Corporation. Microsoft Windows is a registered trademark of Microsoft Corporation. Prices displayed do not include monitor.

organized the Coordinating Committee for Multilateral Export Controls (Cocom). This committee included Japan and countries associated with the North Atlantic Treaty Organization, except for Iceland and Spain. This made any significant or legal transfer of technology into China impossible.

From the Western viewpoint (including Japan's) during the 1950s, '60s and most of the '70s, everything west of Japan and north of Hong Kong was essentially a vast, forbidden territory.

IN A modern world in which no part of the globe was unreachable, China during this period was less accessible than the moon.

Although advisors from the Soviet Union (numbering around 10,000 at their maximum) did enter China in the early 1950s, they departed en masse in 1960 when the Sino-Soviet ideological split occurred.

Moreover, the first successful computer models in the Soviet Union lagged considerably behind those in the U.S., so whatever assistance the Soviet Union provided China in those brief years of cooperation was not really state of the art.

A technological island

All Chinese computer activity that did occur at that time, such as it was, was endogenous to China. Oddly enough, for example, machines with 21-, 32-, 36-, 39-, 42-, 44- and 48-bit architectures were developed during this period. This, perhaps, showed China's willingness to experiment — as well as its lack of commitment to standardization and large-scale production.

We can also speculate that, since Western alphanumerics require only 2^7-bit representation (plus one bit for parity), then eight bits and multiples thereof were natural for Western machines. Chinese designers, on the other hand, were facing the 40,000 ideographs of their language and finding no easy, natural word length on which to settle.

In a modern world in which no part of the globe was unreachable, China during this period was less accessible than the moon. Any technology transfer activity to China thereafter would involve a relatively untouched environment. The country would serve as an excellent, almost pristine, laboratory for both the theory and the practice of technology transfer.

Post-1949 China, seeking to right previous societal and economic inequities, was rapidly communalized and centralized. It was not market driven. After almost three decades of this climate it became apparent to China's leaders that the economy and society suffered from inefficiencies that included a sluggish ability to innovate or absorb and diffuse new technology.

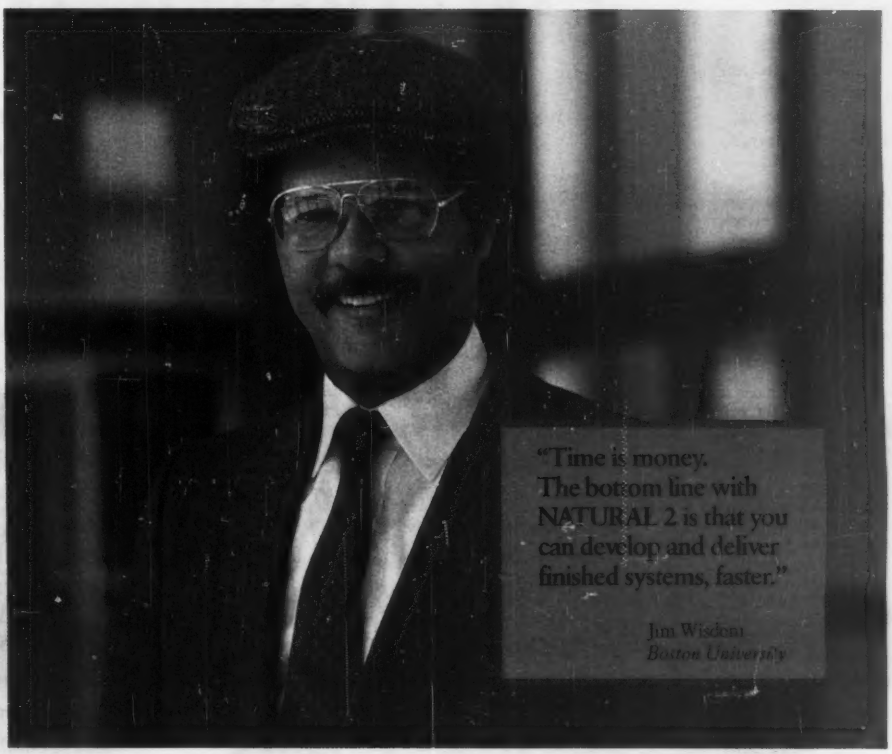
As a result, post-Mao, post-1978 leadership in China dismantled the entire countryside commune system (about 70% of the one billion-plus population), changed the centralized State Plan from mandatory to guidance only, made urban collective enterprises — including computer factories — function on a nonsubsidized profit-and-loss basis, deregulated numerous commodities, encouraged market mechanisms in the national economy and is now protecting a small but growing private sector, including domestic computer consulting firms.

Post-1978 China, orchestrated by Deng Xiaoping, Premier Zhao Zhiyang and others, is now officially described as a "socialist commodity economy" with Chinese characteristics. Pre-1978 China was an ideology-driven society with politics in command; post-1978 China is a performance-driven society with economics in command.

Computer scientists in China can now function in almost the same way as computer scientists in the U.S. — with some job mobility, a fair amount of professional prestige and satisfaction and with rewards for their accomplishments, including material incentives.

Reformist China is specifically an attempt — one that is

NATURAL 2 and the bottom line.



Jim Wisdom can be a tough critic. Tough, but fair. Speaks his mind. That's why we asked him to beta test NATURAL 2.

That's also why his reactions are so nice to hear.

"NATURAL 2 gives you everything you need to develop and deliver online systems, completely and thoroughly," he says. "With NATURAL 2 and other Software AG products, our end users themselves are developing systems that are going into production. Not many people can say that."

For reasons like these, NATURAL has become the *de facto* standard for applications development at Boston University—and at nearly 2500 other sites around the world. Which is also nice to hear.

Discover NATURAL 2. The Next Dimension in 4th Generation technology.

For a free NATURAL 2 presentation diskette, call: 1-800-843-9534
(In Virginia or Canada, call 703-860-5050)

SOFTWARE AG
PROGRAMMING BUSINESS SUCCESS

succeeding in the opinion of many qualified observers — to restructure the entire economy so that productivity and innovation are rewarded.

Inside China

China now seeks — by the year 2000 — to quadruple its performance indicators of 1980; by the year 2050, it hopes to achieve full technological and standard-of-living parity with the world's most advanced economies.

With this policy it seems apparent that China aims to become a significant economic competitor and trading partner, and it should also be clear why U.S. computer export control policy is important to China's modernization.

CHINA seeks by 2000 to quadruple its 1980 performance indicators; by 2050, it hopes to achieve full parity with the world's most advanced economies.

China's reversal in its official policy — which severs all government ties to domestic enterprises — is an astounding departure from pre-1978 China. If realized, this policy could transform the country into a vibrant market economy on a socialist base. (All land is still state owned.)

China's domestic economy in 1983 was the seventh largest in the world after the U.S., Japan, West Germany, France, the UK and Italy. (Figures are not available for the USSR.) In 1986, China's gross national product was $500 billion. There is good reason to believe that with a dynamic growth economy, China can replicate the experiences of the "Four Tigers of Asia" — Singapore, Hong Kong, South Korea and Taiwan — on a vastly larger scale. In this scenario, China would emerge Japan-like as the dominant economic presence in Asia early in the next century, perhaps eclipsing the much smaller island nation.

It was, therefore, not surprising, when I traveled through various Chinese provinces, to see a large number of Japanese businesses. I noted that while Western multinationals and large international banks have offices in major Chinese cities such as Beijing, Shanghai, Guangzhou and Shenyang, the Japanese have extended their presence to the provincial capital levels.

There is a growing, though not yet dependent, symbiotic relationship between Japan and China, accounted for by Japan's need for nearby raw resources and China's need for capital and technology. When American computer vendors complain about the U.S. export control process, it is in part because they see their market opportunities in China being preempted by the Japanese.

As an environment for technology diffusion, China has recently experienced great improvements. But Chinese society is still distant from the consumerism and planned obsolescence of the American economy, where the shortened half-lives of new technologies, even in computer products, keep millions employed in developing successor technologies.

Advertising infrastructure

For a start, though, televisions are now commonly found in households in China, and advertising is now allowed.

This gives rise to a new industry in China — an advertising infrastructure — and encourages the sophisticated use of demographics to promote consumer products as well as the values that lie in commercial success and competition.

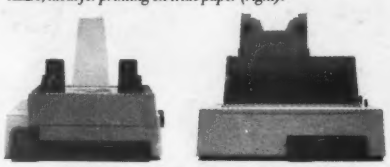
Brand awareness is growing in China, be it Coca-Cola, IBM Personal Computers or Panda tractors, and the population of China is being subtly educated to perceive the benefits of change. Further, previously isolated local markets (fostered by the ideology of self-reliance in pre-1978 China) are being integrated into the regional and national economies, which in turn are now being linked to the international economy.

The point is that broad and

Five ways to improve

No matter what your printing needs or budget, IBM* has a personal printer to help see that your ideas look great on paper, and in the public eye.

The popular IBM Proprinter II (left) and the IBM Proprinter XL24, ideal for printing on wide paper (right).



The IBM Proprinter X24 with optional sheet feed (left) and the IBM Quietwriter III Printer with single-drawer sheet feed (right).

To begin with, there's the newest member of the best-selling Proprinter™ family—the IBM Proprinter II. With Fastfont,™ an extra-fast draft mode, this economical, hardworking printer handles general printing chores faster than ever.

With the IBM Proprinter X24 and wide-carriage Proprinter XL24, you can produce letter quality text and superb graphics in a hurry. When compared to best-selling, comparably priced 24-wire printers, they printed 1½ to 2 times the draft output in the same amount of time.*

For even higher quality text and graphics, consider the IBM Quietwriter® III Printer. It whispers along at nearly twice the speed of its predecessor and is available with either a single- or dual-drawer sheet feed, for added paper-handling convenience.

If you're looking to design and print documents with a professional look, we offer the IBM SolutionPac™ for Personal Publishing. This compact, desktop publishing system comes with everything you need—the hardware, software, service and support—to design and print eye-catching presentations, newsletters, memos and more.

The IBM SolutionPac for Personal Publishing includes IBM's high-quality laser printer, the Personal Pageprinter.

For further details, visit an IBM authorized dealer (ask about the IBM Credit Card), or call your IBM Marketing Representative. For the name of a dealer near you, call 1-800-447-4700, ext. 51. (In Canada, call 1-800-465-6600.)

IBM®

© IBM 1987. IBM and Quietwriter are registered trademarks, and Proprinter, "SolutionPac" and "Fastfont" are trademarks, of IBM Corporation. *Based on a March 1987 independent evaluation of the then best-selling, comparably priced printers using the *PC Magazine* Labs Benchmark Series.

self-sustaining technological diffusion in China now appears to be well into the start-up phase of, first, building a strong foundation of national receptivity and of building new norms and attitudes that will enable the successful transfer of technology when it does occur.

We must remember, however, and reemphasize the status in which China now finds itself, as a developing country. Diffusion of technology in China can be very difficult in a still resource-poor environment.

No loans, no lights

For example, the scarce foreign currency reserves with which to invest in technology from abroad must be carefully rationed. China's foreign exchange reserves during the past decade have ranged from about $16 billion to about $11 billion. China prefers a pay-as-you-go policy, only very carefully accepting loan financing. Investment, however, is encouraged.

Energy resource shortages result in an electrical power matrix that cannot provide enough electricity, depriving more than 100 million Chinese of even electric light, not to mention power for computers.

For example, at Sun Yatsen University in Guangzhou, where I spent much of a year, we had no electricity for a period of one day each week. At the campus computer center, a Fujitsu Ltd. Facom 340-S and a Digital Equipment Corp. VAX-11/85 were installed while I was there, but for some of the Chinese, no electricity meant only a day off, a day to catch up on shopping.

China is a unique socio-technological environment, and that environment affects the role of computer technology in China. Rod Macleod, whose corporation opened an office in Shanghai, perhaps described it best in a letter to the World Bank:

"In developed countries, commercial computer technology developed over 30 years in an environment fueled and enriched by 40 years of government and military technology and 50 years of pure and applied

your public image.

Full Court Press - 4th Quarter Report
U.S. SALES DEMOGRAPHICS
All-Stars Clinch Division Title
Heavy hitting powers All-Stars to the top
All-City League Final Standings

ENERGY resource shortages deprive more than 100 million Chinese of even electric light, not to mention power for computers.

research in cybernetics, industrial engineering, management and organization. The computer scientists [in those countries] are embedded in a very complex network of related technologies which both use and sustain them. Probably only a few understand the whole network, and those who do are probably not interested in or able to implement change, especially in China.

"Thus, bringing computer technology to bear on China's modernization is not as simple as many believed."

Get involved

Crossing into a climate in which organizations, once automated, are unable to function without technological supports requires a change in the "day off" attitude and a realization by China's computer scientists that they and their skills are becoming embedded in the infrastructural needs of their nation. China's computer scientists of pre- and post-1970s must now come out of their laboratories and become involved in the practical application needs of their economy and society.

In the 1960s in the U.S., we learned the difficulties of human/machine interfaces in automating large organizational activities. There is every reason to believe that in China, which has a reputation for bureaucratic inertia, the automation task will be even more difficult. Diffusion of computer technology will occur at an effective rate only through a persistent, proactive effort by China's computer scientists with the well-articulated support of top leadership and middle managers.

On my travels in China, I frequently encountered underutilized machines, and I began to realize that the managers responsible for them were quite happy, thinking that possession

of a computer ipso facto meant that their organizations had become modernized. They gave little thought to implementing automation and seemed not to have any incentive to do so. The situation was so widespread that I compared notes with others in China, and we came to suspect that as much as 50% of all computer capacity in China is not being used. Enlightened management and leadership are, therefore, needed resources in China. Solely by reason of the country's domestic resource constraints, computer technology transfer to China will, for now, have to be incremental.

Ongoing relationship

When an organization in China procures an American computer system, the contract package typically involves training for several people in the U.S. — the systems engineer, operations people and others — at the factory where the system is being assembled and may also include an ongoing service relationship after installation. Hence a fair amount of know-how is also being transferred.

However, China has become adamant that, while it does need the packaged computer systems in the short run, it intends to develop a domestic computer industry in the long run; therefore, it seeks transfer of computer manufacturing know-how.

Premier Zhao Zhiyang's sees the world very much in business terms. According to one American who lives in Shanghai, he said, "China will not become IBM's little brother" — or "*xiaodi*," a term that conveys affection but also clearly confers a status of lesser maturity and lesser independent capability.

Accordingly, China's congress recently enacted legislation establishing incentives and rules for multinationals to join with China's domestic industries in joint ventures, coproduction and investment.

China's preference is that the multinationals share more advanced technological capabilities in manufacturing, design, development, servicing and management with China's enterprises. Electronics is identified as one of the key industries for these joint ventures.

AT BEST, joint ventures formed to date between Chinese enterprises and multinationals are still exploratory. Many have been fraught with difficulties.

In fact, China recently began to enact protectionist import taxation to shelter some portions of its fledgling domestic computer industry — microcomputers, for example, which have developed very rapidly as a domestic capability in China.

This stands as evidence of the velocity of technology diffusion from the shores of California to the suburbs of Shanghai. At the same time, China encourages the import of advanced and large-scale machines when need cannot be met by domestic products — which is usually the case.

Still new

At best, joint ventures formed to date between Chinese enterprises and multinationals — such as IBM, Intel Corp., Burroughs, Hitachi Ltd. and others — are still exploratory. Many have been fraught with difficulties, such as repatriation of profits, lack of access to local markets and strained management relations with local labor.

A good reason the verdict is not in yet on electronics joint ventures with China is that many of them are fairly long-range (10 to 15 years or more) and have been only recently formed.

Another difficulty, as Steven R. Hendryx describes it, is "*Tong zhuang, buyi meng*," or "sleeping in the same bed, but dreaming different dreams" (*The Columbia Journal of World Business*, Spring 1986).

Hendryx negotiated, organized and launched the China-Tianjin Otis Elevator Co. venture. Otis is a 130-year-old, multibillion-dollar subsidiary of United Technologies Corp.

Although one of the earlier

Boston
Washington, D.C.
Dallas
San Francisco
Los Angeles
UNIXEXPO
THE UNIX OPERATING SYSTEM
EXPOSITION AND CONFERENCE
Jacob K. Javits Convention Center • New York City • October 27, 28, 29, 1987
PORTABILITY, APPLICATIONS &
UNIX EXPO, A WINNING COMBINATION
Combine the freedom of portability with the expanding menu of innovative multi-user applications and solutions and reinforce the productivity and profitability of your business. Join the thousands of business and computer professionals at UNIX EXPO where you can explore the many options the dynamic UNIX environment offers.
• Interact with the leaders in multi-user hardware, software, training and consulting as you gain valuable insight into versatility, portability and affordability of the UNIX System.
• Profit from an extensive Conference which will offer you information on the newest developments and an understanding of the latest applications and product offerings.
• Avail yourself of the finest technical training, featuring hands-on computer labs, and come away with skills you can apply towards the varied challenges facing today's professional.
If you would like information on UNIX EXPO, contact: National Expositions Co., Inc. • 49 West 38th Street, Suite 12A • New York, NY 10018 • 212/391-9111 • Fax: 212/819-0755 • Telex: 135401 dimcomm.

COMMUNICATION NETWORKS GOES TO PARIS AS RESOCOM, FRANCE'S FIRST COMMUNICATIONS EXPOSITION.

For the first time ever, Communication Networks goes to Paris — and delivers the volatile French communications marketplace to you.

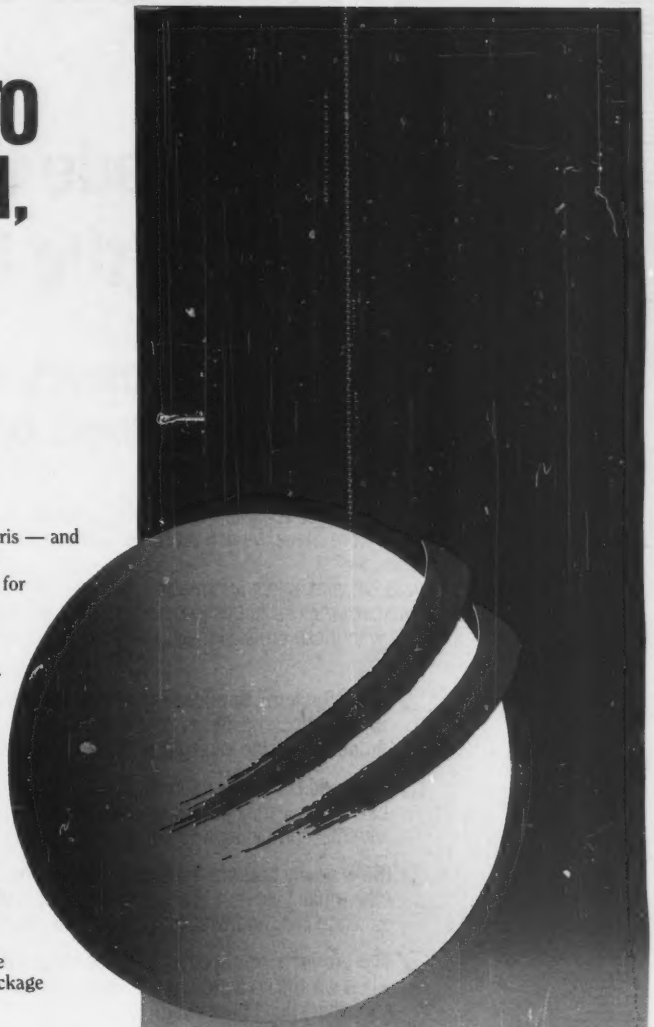
Resocom, scheduled for February 16-19, 1988, is the place for you to get in on the ground floor as France's communications industry undergoes privatization.

Derived from the French word "reseaux" meaning "network," Resocom gives you the chance to meet users, dealers, and distributors alike. In fact, Resocom is expected to put exhibitors — like you — in touch with approximately 8,000 qualified buyers.

What's more, backed by the 10-year success of Communication Networks in the United States, you're guaranteed a prime opportunity to actively market your products and services to thousands of industry professionals involved in the purchase process. Plus, with France's communications industry undergoing privatization — and PC Forum taking place simultaneously — the timing couldn't be better for you.

Never before have you had an opportunity like Resocom to literally deliver the real buyers of France's voice, data, and telecommunications equipment, services, and software — right to your booth.

Resocom. It's the perfect time and place for you to capitalize on the burgeoning communications market in France. And a turnkey exhibit package makes your participation both easy and economical.



To reserve your exhibit space at Resocom or for more information on exhibiting or attending, call your local Hajar Associates representative listed below.

Northeast
Silvio Mandino
Hajar Associates, Inc.
45 Walpole Street, Suite 1
Norwood, MA 02062
(617) 769-8950

Midwest
Nanette Traetow
Hajar Associates, Inc.
2920 West Case Road
Dublin, OH 43017
(614) 761-1053

Mid-Atlantic/Southeast
Judie McDaid
Hajar Associates, Inc.
66 Dunbar Road
Palm Beach Gardens, FL 33418
(305) 694-0689

Southwest/Northwest
Barbara Jones
Hajar Associates, Inc.
3303 Harbor Boulevard, Suite G-11
Costa Mesa, CA 92626
(714) 540-3554

RESOCOM

Resocom is being produced by Capric Organization, producer of several European shows including PC Forum, in conjunction with two IDG Communications' publications in France: *Telecoms International* and *Le Monde Informatique*. Serving as show coordinators in the United States is IDG Conference Management Group, an International Data Group Company.

Has IBM made the grade in its "Year of the Customer?"

Your customers will be looking at the answers on November 18.

IBM declared 1987 to be the Year of the Customer. But does the Customer agree? Changes and promises were made. Which promises were kept—and which changes were to the benefit of the customer?

MIS/DP and other information systems professionals will find out November 18 when *Computerworld Extra* publishes a report card for Big Blue. And this special issue will put you in touch with these professionals. Planned topics include:

- **IBM's Systems Applications Architecture** (SAA), which promised to address IBM's own compatibility problems. When and how will it be incorporated into products *and* the information systems environment?
- **PS/2 and OS/2:** Their current state (and problems) have been well documented, but what will they grow into—and has IBM truly responded to customer needs with this combination?
- **IBM's newly created Applications Systems Division,** which seeks to (among other goals) aid non-IBM software vendors as they develop applications. How far along is it, and what is the expected effect on the market?
- **The products released in the Year of the Customer:** How did they fare, and when will the next products become available? Which are in the distant future—and which don't have a future?

How successful IBM has been—and will be—in reorganizing its marketing/selling approach *and* responding to competitive challenges, is certain to attract the attention of computer-involved professionals.

If you market IBM or IBM-compatible products or services, here's an outstanding opportunity to reach more than 125,000 paid subscribers and hundreds of thousands of pass-along readers. Reserve your space by calling Ed Marecki, Vice President/Sales, *Computerworld* at (617) 879-0700. Or call your local *Computerworld* sales representative. This *Computerworld Extra* on IBM closes October 16, so hurry!

COMPUTERWORLD *Extra*

Sales Offices: Boston (617) 879-0700/**New York** (201) 967-1350/**Washington D.C.** (703) 280-2027/**Atlanta** (404) 394-0758/ **Chicago** (312) 827-4433/**Dallas** (214) 233-0882/**Los Angeles** (714) 261-1230/**San Francisco** (415) 347-0555

An IDG Communications Publication

and more successful joint ventures formed in China to date, China-Tianjin Otis was often hampered by sharp differences in attitude.

"In general, most industries in China are currently driven by technology rather than marketing," Hendryx says. "That is, products are largely conceived and designed by engineering, usually striving to be as advanced as capabilities allow. The notion of first doing a survey of market needs and preferences and designing products to meet those needs is alien."

When making agreements with the Chinese, it is important not to make culturally inappropriate assumptions. Extensive preagreement negotiations help clarify the expectations of all parties involved and build a relationship of trust.

Another attitudinal difficulty Hendryx describes is compartmentalism, or the tendency to organize along vertical functional lines with minimal horizontal communications. This is a result of the old State Plan called "*danwei sixiang*," or the "my unit" mentality. This mentality is sometimes referred to in China as "*shantou zhuyi*," or "mountain peakism"; that is, "this mountain peak is my territory, and the others are not my concern."

I do not mean to imply any inherent deficiency in the abilities of the Chinese, but there are real conceptual difficulties resulting from a different, if now changing, systemic environment.

Hendryx reports that after a year and a half of operations, the China-Tianjin Otis venture is highly profitable, and, despite snags, advancement is being made in the transfer of new-product technology and in the introduction of the new product to the market. However, elevators have never, to my knowledge, become a U.S. national security concern, and, therefore, Hendryx never had to deal with the labyrinthine U.S. export controls system.

> "MOST industries in China are driven by technology rather than marketing."
>
> STEVEN R. HENDRYX
> CHINA-TIANJIN OTIS
> ELEVATOR CO.

One of the early attempts by the Chinese to bring in their own advanced electronics production know-how is the Jiangnan Semiconductor Device Factory in Wuxi, located just west of Shanghai. The factory, which is intended as a Ministry of Electronics showcase, has been visited by several American delegations and reported on extensively by Jonathan Pollack, a Rand Corp. China specialist who visited China during part of the year I was there.

The Jiangnan factory, according to Pollack, is part of the Ministry of Electronics' attempt to make the important move from traditional electronics to microelectronics during the crucial seventh five-year plan (1986-1990). It is the result of a Ministry of Electronics contract

ESS, at the forefront of spreadsheet software since 1982, supplies a comprehensive decision support system for mainframes. With regular updates and extensive technical support, ESS from Trax expands your spreadsheet capabilities beyond conventional horizons.

- True 3D spreadsheets
- Database interface to DB2 and SQL/DS
- File compatibility with microcomputers
- Direct consolidation from the catalog screen
- Ability to read and write external mainframe files
- Graphics interface
- Interface to REXX, EXEC2, and CLIST languages
- Assembler source code for fast execution and low memory requirements

Enter another dimension in spreadsheet performance—now available for the new 9370—CALL TRAX TODAY!

Trax™

Trax Softworks, Inc.
10801 National Boulevard | Los Angeles, CA 90064-4126
213 475-8729 | TELEX 350048

NOW THERE'S A NEW NAME ON THE BLOCK FROM THE LEADER IN DATA TRANSFER SOFTWARE...

The Systems Center put the foundation in place with Network DataMover (NDM) for MVS. It became the data transfer standard among leading corporations with multiple MVS mainframes. To top it off, now there's Network DataMover for VM.

The two products are built on a common architecture. Which gives you the ability to transfer VM files, such as CMS, into one of many MVS file formats. And vice versa. NDM also gives you complete control over MVS and VM data transfer operations through automation, security and detailed audit trails.

So whether your network includes MVS, VM or both, NDM offers a single solution. But these are just two of the NDM names on the block. There are more just around the corner...

1-800-292-0104
In Texas 214-550-0318

SYSTEMS CENTER The Network DataMover Company

The Systems Center, Inc., 2477 Gateway Drive, Suite 101, Irving, TX 75063

IBM is a registered trademark of International Business Machine Corp..

Wouldn't it be nice if isolating network problems was this easy?

Our new network managers let you find problems and fix them faster and easier than ever before.

At Codex, we understand that no one relishes the thought of looking for network problems. Because if you don't find problems and fix them quickly, chances are they'll find you.

That's why we designed our new 9300 Series network managers to make finding and fixing any problem incredibly easy.

The 9300 Series includes a unique package of software-based features. Like color graphics that instantly identify and code the severity of network problems. Using Microsoft Windows®, standard PC software, for multi-tasking, pull-down menus, mouse operation and convenient on-line help functions.

Which means you don't need highly skilled people with specialized training to manage your network.

The 9300 Series gives you the monitoring, diagnostics, control, restoral and even management reporting capabilities you expect from larger systems. It supports multiplexers as well as modems. Yet it uses familiar PC software, and hardware like the IBM PC AT and HP Vectra. All of which makes it the fastest, most effective entry-level family of network managers available today.

For information about the new family of 9300 Series network managers, call **1-800-426-1212, Ext. 283.**

Or write Codex Corporation, Dept. 707-83, 7 Blue Hill River Road, Canton, MA 02021-1097.

And we'll point out how easy managing your network can be when you have the right help.

codex
MOTOROLA
The Networking Experts

© 1987 Codex Corporation. Motorola and ® are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation. IBM is a registered trademark of International Business Machines Corporation. HP is a registered trademark of Hewlett Packard. Windows is a registered trademark of Microsoft Corporation. Sales offices in more than 40 countries worldwide. In Europe call 32-2-6608980, in Canada 416-799-5700, in the Far East 852-5-666706 (in Japan 81-3-5848101), in the Americas 617-364-2000.

Visit Codex at NASTA, October 20-22, booth #506-507

with a consortium of foreign firms (including 42 U.S. suppliers) to provide production and testing equipment for a modern semiconductor plant to produce 24 million linear integrated circuits for use in Chinese televisions. One delegation commented that the plant will "compare favorably to modern semiconductor facilities now in operation in the U.S."

Some Chinese managers at Wuxi complained about delays in U.S. export licenses, but all in all, visits showed the plant to be a success, with all ordered equipment in place by mid-1984 and managers claiming that 86% of the televisions manufactured in Chinese plants used chips produced at Wuxi.

Open doors and minds

Pollack comments, "Many U.S. suppliers exhibit considerable hesitancy in the transfer of production technologies . . . in the belief that it will remain easier and more profitable to sell items and to provide services and training in the use of such equipment."

Sadly, such a strategy manifests a deep misunderstanding of China and a failure to perceive the benefits of establishing long-term, mutually beneficial relationships, such as the China-Tianjin Otis venture.

Corporate strategists need to plan for China's development into the 1990s and well beyond.

The China representative for a large multinational firm who installed 100 units of his product in China this year and then claimed success in the China market because 100 units is 25% more than last year is short-sighted. I want to know what commitments he has for the years 1997 and 2007.

President's-eye view

Fortunately, our own national leadership has a larger vision about China. For example, in April 1984, a few months after Premier Zhao Zhiyang's visit to the U.S., President Ronald Reagan addressed an audience of Chinese faculty and students assembled at a university in Shanghai.

"New satellites can be launched for use in . . . computer technology. . . . We hope to see the day when a Chinese scientist working out an engineering problem in Fudan University will be able to hook into the help of a scientist at a computer at MIT. And the scientist in Boston will be able to call on the expertise of the scientist in Shanghai, and all of it in a matter of seconds. My young friends, this is the way of the future," Reagan said.

Following that, in October 1985, Vice-President George Bush addressed a similar assembly at a Chinese university in Chengdu, Sichuan. Bush said, "We are also ready to help China. . . . One way is that we will soon be funding a study of the feasibility of a national communications satellite for China."

These White House statements to Chinese audiences add up to an American endorsement of extending capabilities in wide-area networking to China. It will be an important step, one that will build the connectivities that will service the trans-Pacific needs of the next century.

As of last year, computer-related

What? Develop and run CICS applications directly under VM? Yes-Finally, with VMCICS !

Introducing VMCICS/Development System and VMCICS/Execution System

VMCICS/Development System and VMCICS/Execution System are powerful, easy-to-use systems that let you develop and run command-level CICS programs under VM. With no guest operating systems. No software modifications. No hardware restrictions — from 9370 to 43XX to 30XX and all compatibles.

With VMCICS/ES you can run current CICS applications at savings far in excess of your one-time investment. And with VMCICS/DS you can develop, debug and test CICS applications faster and more easily than ever — allowing you to significantly improve programmer productivity.

Both VMCICS/ES and VMCICS/DS provide improved stability for CICS applications. Each application runs under its own "CMS Machine," so individual users can't crash the whole system.

Best of all, VMCICS/ES and VMCICS/DS are available from Unicorn Systems, the leading supplier of CICS products for the VM Operating System.

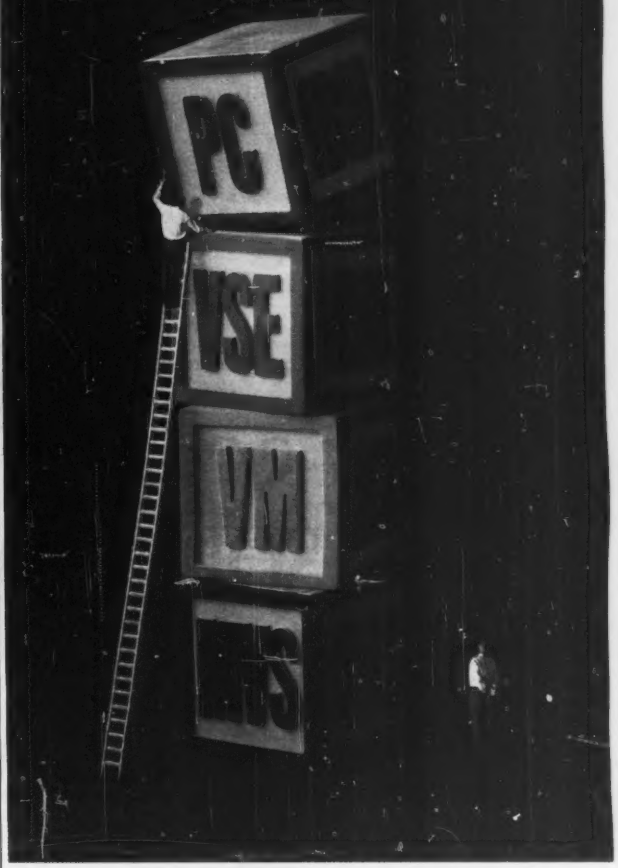
So why delay? Call us today toll-free at **800-222-6974** (from California call **800-232-CICS**).

unicorn

Unicorn Systems Company
3807 Wilshire Boulevard
Los Angeles, California 90010
(213) 380-6974

VMCICS is a trademark of Unicorn Systems Company.

NETWORK DATAMOVER MEETS YOUR DATA TRANSFER REQUIREMENTS NO MATTER HOW THEY STACK UP.



Staying on top of your network is a big challenge. How do you transfer different file types between MVS and VSE? Or VM and PC? How do you coordinate production activities among data centers? What if they're using different security systems? Or running at different release levels?

Network DataMover (NDM) meets all these challenges while making the technology transparent to users. There are standard data transfer and production management tools at all NDM nodes. And all nodes operate as peers.

So give us a call if you need to get your data transfer operations off the ground. NDM offers a single solution from top to bottom. No matter how your network stacks up.

1-800-292-0104
In Texas 214-550-0318

SYSTEMS CENTER The Network DataMover Company

The Systems Center, Inc., 2477 Gateway Drive, Suite 101, Irving, TX 75063

IBM is a registered trademark of International Business Machine Corp.

technology transfer to China is still largely a transfer of products — at least 70% of the total business activity — with only a few representative and seminal commitments to transfer manufacturing know-how.

It is not impossible, though, for China to blossom in the next five to 10 years as the huge offshore manufacturing haven of the 1990s. Such a development could affect the entire organization of the global electronics industry.

Ramping up at home

Meanwhile, China is ramping up its own domestic computer technology capabilities. By 1971, the country had announced its first prototype of an integrated-circuit, or third-generation, machine.

By around 1980, China's Institute of Computing Technology was able to produce a prototype integrated-circuit-based machine that was capable of 1.4 million operations per second and housed 72K bytes of internal memory, disk storage, a fairly sophisticated operating system and a full range of language compilers.

Soon thereafter, the institute announced a vector-array machine with similar characteristics but with a larger internal memory of 4M bytes. Both of these machines probably had multitasking capabilities to some degree.

These machines are clearly strong third-generation computers developed by the Chinese, possibly equal in technology to what was widely available on the market in the U.S. in about 1970; that is, about equal to a mid-range IBM 360.

However, China's machines did not go into full-scale production. At best, it seems that not more than 100 copies of the models have been produced, so there was no wide diffusion of the technology. At that time, China had a national total of approximately 1,000 installed large and medium-scale machines for a saturation ratio of about one machine per one million people.

IN 1970, China had a total of approximately 1,000 installed large and medium-scale machines for a saturation ratio of about one machine per one million people.

By contrast, in the U.S. the number of installations in 1980 numbered about 400,000, for a saturation ratio of about 2,000 machines per million people, and that did not include microcomputers.

In addition, the technology installed in the U.S. in 1980 was moving toward the early fourth generation, about a generation ahead of China. More importantly, penetration of the technology into the fabric of the American economy and society was far greater.

Of course, the situation is always dynamic, but taking a snapshot of China in 1979 and again in 1986, it appears that U.S. export control policy has functioned effectively to maintain China's computer capabilities at a significant distance behind the U.S.'s state of the art.

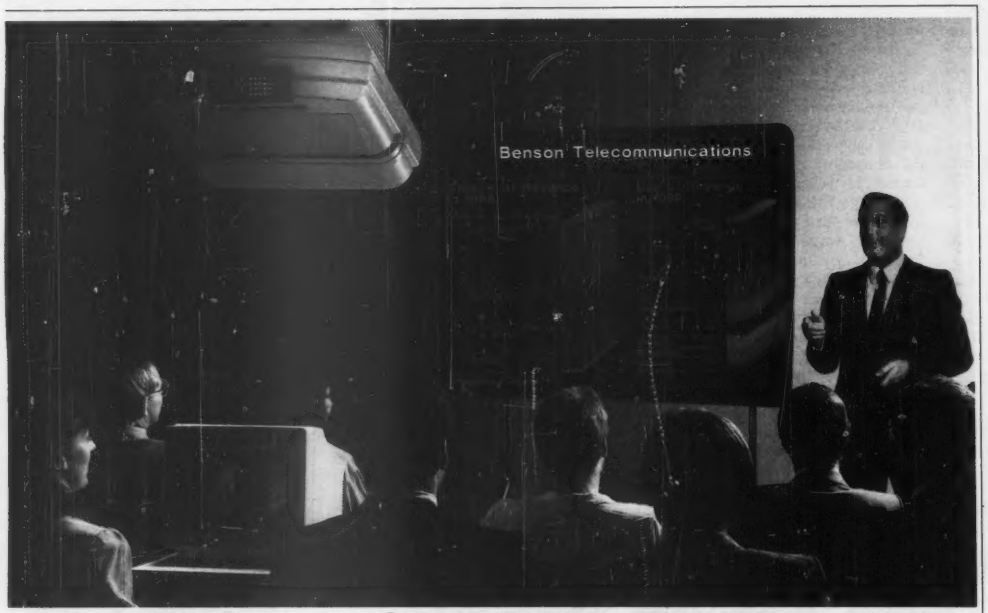
Evolving, but slowly

While in China recently, I saw fourth-generation U.S. technology products (VAXs and high-end IBM 4300s, for example), but I did not see any transfer of fourth-generation technology processes. And, of course, the U.S. is now moving into fifth-generation technology.

So yes, China has been enhanced, but only incrementally. This seems to be the obvious effect of U.S. export constraints vis-a-vis China and computer technology. It is, for now, only a matter of speculation about whether U.S. industry would self-impose similar constraints were government deregulation to occur.

For now, technology transfer to China is evolutionary, and it is clear that the cornucopia of U.S. computer technologies is really not open for China to simply buy anything it can pay for. •

Next week: How the U.S. shares its computer manufacturing know-how with China.



LARGE SCREEN DISPLAY SOLUTIONS

Whenever two or more people get together to examine computer data/graphics, a real-time, large screen projection system is an invaluable tool.

Electrohome pioneered the concept of computer projection and, today, offers the most complete line of advanced systems. In the forefront are the new ECP® GRAPHICS single lens and ECP 3000 three lens systems. Both feature an advanced microprocessor that simplifies operation, and widens the capabilities gap between Electrohome and other projection systems.

Computer Intelligence makes the difference

This powerful microprocessor directs and monitors the main functions of the projection systems. Infrared remote control, help menus, frequency auto lock, diagnostics, digital convergence and memory are the prime benefits. "Plug-in module architecture" allows for the use of a variety of optional modules – extending functionality and hardware updating.

The ECP Graphics

This new single lens system can project images generated by high resolution (1024 × 1280 pixels, non-interlaced) CAD/CAM terminals, as well as video. Because it automatically locks on scan rates from 15-80 KHz, it's perfect for use with VCRs, PCs, terminals or high res CAD/CAM work stations. The ECP GRAPHICS is extremely portable and has VARI-FOCUS for screens 5' to 14' diagonal (front, rear or curved).

The ECP 3000

This new 3-lens system offers a bright, crisp image for screen sizes from 5'to 25' diagonal (front, rear or curved) and VARI-SCAN from 15-50 KHz. Like the ECP GRAPHICS this unit has a multi-function infrared remote control that includes digital convergence and all projector functions.

Large Screen Solutions for every application

Sales and Service in 40 Countries Worldwide. For more information on Electrohome color and monochrome projection systems, send your business card to

Electrohome Limited,
P.O. Box 628, Buffalo, NY 14225-0628.

In the U.S.A. call 1-800-265-2171.

In Canada call 1-519-744-7111.

ECP® is a registered trademark of Electrohome Limited.

Screen image courtesy of SAS Institute Inc.

ELECTROHOME

EYE-OPENING LARGE SCREEN PRESENTATIONS

SEE US AT FCC BOOTH #1615

MANAGEMENT

TAKING CHARGE

Efrem Mallach

Education of a CIO

"The CIOs are coming! The CIOs are coming!" Latter-day Paul Reveres ride over the land to warn MIS execs of their impending doom. The DP shop will disappear by 1992 or 1997. Data processing is out. Information is in.

Woe to those who merely keep machines humming, getting reports out on time and keeping inventory under control. The future belongs to strategic information systems. Adapt or join buggy-whip makers and Hula Hoop distributors on the breadline.

Sounds easy. "Yesterday I had to worry about machines," the MIS chief says. "So I did. Today I have to think about information, so I'll do that." Right? Wrong.

The MIS executive who is worried about the future value of his skills should do two things.

First, keep doomsayers in perspective. The mainframes tracking Aetna policies and TWA flights will not soon disappear. Massive data bases will not migrate to departmental minis or PC local-area networks during the next decade. Traditional data processing will continue to be right for many vital applications. Some of these fit today's fashionable "mission-critical" category.

Large systems won't get the

Continued on page 86

Black DP group urged to stay in corporations

BY DAVID A. LUDLUM
CW STAFF

NEW ORLEANS — Layoffs prompted by global economic competition could unravel advances in corporate life made by blacks in recent years, the leader of the Black Data Processing Associates (BDPA) said recently at the group's ninth annual conference.

Black DP professionals should focus their attention on mainstream initiatives aimed at strengthening American economic competitiveness in order to maintain the advances they have made, said the group's president, Gerard Anderson, a systems engineer at IBM's sales office in East Orange, N.J.

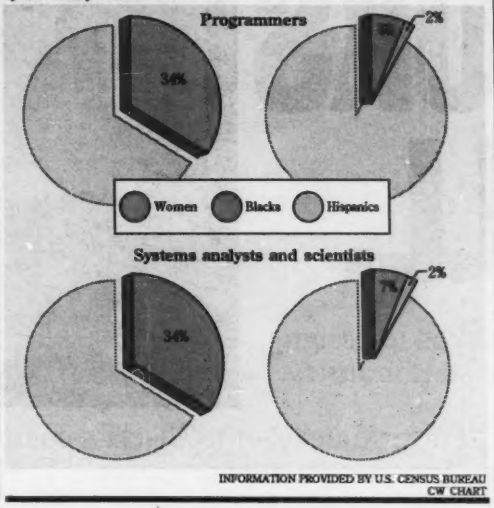
"We stand to lose two generations of work if the [civil rights] movement does not address the black professional," Anderson said at the conference, which ran Sept. 13-20.

In an interview, Anderson noted that despite the challenges he cited, his position underlines a growing confidence on the part of blacks that they can succeed in corporate America. Traditionally, the BDPA has emphasized entrepreneurship as a means for black DP professionals to suc-

Continued on page 81

Women and minorities

Women and minorities in computer occupations as percentages of the totals for 1986



INFORMATION PROVIDED BY U.S. CENSUS BUREAU
CW CHART

Hacker makes good

Former budgeteer takes on systems development

BY PATRICIA KEEFE
CW STAFF

LOS ANGELES — It all started innocently enough. Little did Chuck Winckler know that when he started hacking around with a computer at home in 1983 he was onto something big — both in the way his department would work and in the detour his career was about to take.

As Winckler tells it, his interest in computers was piqued that February by a request from his youngest son to take a course in using an Apple Computer, Inc. computer after school.

"I said, 'Gee, I'd better learn this,' so I bought an Atari and got interested in being a hacker at home," Winckler says.

In June of that year, Winckler, then in charge of budgeting and strategic planning for the External Affairs office of the Pacific Telesis Group, attended a seminar on office automation with his boss, Gerald Foster. "The professor talked about access to information, and we got all excited," he recounts.

Knowing that Winckler dabbled in electronics, Foster offered him what is turning out to be the assignment of his career: Automate. Back then, the assignment was simple. " 'Learn all you can, and then let's automate.' Little did I know what that meant. I'm still doing it," Winckler jokes.

Four years later, the 44-year-old manager, now director of support systems development for Pacific Telesis Southern Region External Affairs, is still at it.

A good understanding of the political environment, coupled with knowledge of what technology can do within that framework, has served Winckler well in his quest to automate where possible.

His philosophy is to approach automation from the standpoint of giving everyone, not just clerical workers, 10% more time to do their job. "If you can explain that automation is a management tool, just like budgeting, you have a better chance of selling it," Winckler says.

Foster set the stage, but it was Winckler and Lydia Arzate, then his assistant and now the office manager, who rolled up their sleeves and waded through the sea of applicable technology en route to implementing cost-saving programs cooked up by Foster and Winckler.

Winckler estimates that the initial foray into automation cost

Continued on page 85

PROFILE
Chuck Winckler

Position: *Director of support systems development, Pacific Telesis Southern Region External Affairs.*

Mission: *To provide users with the services they want and 10% more time to do their jobs.*

JAMIE BUDGE/GAMMA LIAISON

MANAGEMENT MEMO

MIS eyes Chinese workers; execs face more info

The search for affordable programming talent is pushed further afield as a San Francisco firm aims to supply American corporations with programmers from the People's Republic of China.

The China Professional Resources Consortium (CPRC) has recently reached agreements with China's State Science and Technology Commission and other government authorities to provide the programmers, according to CPRC President John R. Cavalli.

The CPRC would provide American clients with English-speaking contract programmers on-site in the U.S. or in Chinese development shops, according to Cavalli.

The programmers typically earn about $33 a month, Cavilli added.

Cavalli says he hopes to sign contracts with the Chinese authorities in about a month, at which time he may have deals with a large insurance company and a large financial services concern — one on the East Coast and the other on the West Coast.

China has established four software technology development centers, and major universities there offer computer science programs, the CPRC says.

Most Chinese developers work with IBM 4300 mainframes running IBM's MVS/SP or DOS/VSE, "all kinds of minis and one hell of a lot of PCs," Cavalli says.

Chinese programmers have developed operating systems and applications for banking, hotel management, satellite communications, cargo tracking and manufacturing, he says.

The chief information officer, or CIO, charged with managing his organization's abundance of data, faces two new sources of information aimed directly at him.

This month, IDG Communications, Inc. in Framingham, Mass., publisher of *Computerworld*, launches *CIO* magazine, and market research firm Dataquest, Inc. in San Jose, Calif., unveils its CIO Adviser service.

CIO, a monthly to be distributed by controlled circulation, is positioned between general business periodicals and MIS trade journals, Editor Marcia Blumenthal said. It will address issues such as dealing with vendors, vertical market strategies and implementing technologies.

The CIO Adviser service is Dataquest's first product specifically designed for computer users, according to Linda O'Keeffe, a vice-president.

It is intended to provide "a window into Dataquest" through an account manager who provides a client with appropriate portions of the firm's research, contacts with analysts and periodic on-site briefings.

At $15,000 a year, it is targeted at Fortune 1,000-sized firms worldwide.

DAVID LUDLUM

HOW A PITTSBURGH DESIGNER USED THE POWER OF NEC TO CREATE SOMETHING THAT LOOKS LIKE HELL.

When Keystone Drafting was asked to design a high-temperature furnace for the steel industry, they turned to the power of NEC.

Specifically, they used the NEC PowerMate™ 2—the AT-class computer that's ideal for CAD/CAM, scientific modeling and presentation graphics. "The PowerMate 2 not only helped us meet a tight deadline," says one of the Keystone designers, "but enabled us to keep improving the design right up until the last minute. The client was so happy, they gave us some new business. Which is why we now have seven PowerMate 2 computers instead of the two we started out with."

The NEC PowerMate family of personal business computers. Because sooner or later, you're going to have to take it to the limit.

Take it to the limit.

NEC

To learn more, and to find out the name of the NECIS reseller nearest you, call 1-800-343-4419 (in MA, 617-264-8635). In Canada, call 1-800-387-4313. Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

C&C Computers and Communications

Black DP pros

CONTINUED FROM PAGE 79

ceed in the face of discrimination. Anderson emphasized that Section 1706 of last year's federal income tax reform law has hindered many black independent DP consultants and professionals because of the limitations it imposes on their ability to work independently.

Elsewhere at the conference, which was attended by roughly half of the BDPA's 800 members, a discussion of working relationships between male and female black DP professionals generated considerable interest.

Black female professionals face a marked lack of respect from their black male colleagues, said Sam Hayes, a project supervisor with Middle South Utilities Systems Services, Inc., to the general concurrence of those attending a discussion of the issue that he led.

The situation is compounded by the growing predominance of women among

> "WE STAND to lose two generations of work if the [civil rights] movement does not address the black professional."
>
> GERARD ANDERSON
> BLACK DATA PROCESSING ASSOCIATES

black DP professionals. Despite the general predominance of males in the field [see chart], roughly 60% of the members of the BDPA are women. This reflects a general pattern among black DP professionals, according to association officials.

There is an even greater predominance of women among blacks enrolled in college, suggesting that the imbalance will grow, the officials said.

In keeping with a goal of outreach to the black community, the conference included a competition in which teams of high school students from New Orleans and Atlanta competed in an examination on DP topics and in developing a program to generate reports showing fees incurred for use of a campsite. The students used IBM PC ATs donated by IBM.

The conference also included a presentation on an artificial intelligence model of a black teenager that was developed by a group of teenagers in the Washington, D.C., area using the AI programming language Turbo Prolog.

The project was aimed at introducing black students to a new technology before it became outdated, said Jesse L. Bemley, information manager for the U.S. Army's Cost and Economic Analysis Center and founder of Joint Educational Facilities, Inc., which organized the project.

The conference included an exhibition area staffed by DP recruiters for about a dozen companies, including 3M Co., Digital Equipment Corp. and PARS Service, Inc., operator of the reservation system serving Trans World Airlines and Northwest Airlines.

Representatives of several of the companies said they try to help meet goals or guidelines — but not rigid quotas — for hiring blacks, other minorities and the physically handicapped.

It's not a minicomputer you will outgrow. It's not a PC network that promises more than it can deliver. It's not a mainframe you can't afford...

Unisys announces the birth of the Smallframe.

You're invited to celebrate the arrival of the newest member of the Unisys product family, as well as the birth of a new concept: The Unisys Smallframe.

It's three different tiny computers: A1, A4 & A6. Each built to fit in the same size cabinet, each with a small footprint and a low price. (That's what we meant when we said "Small.")

But each starts you running true mainframe applications economically and quickly. Plus, Smallframes use the same operating system as our biggest A Series mainframe—and every machine in between—without any software conversion. (That's what we meant by "frame." As in main*frame*.)

What potential!

With the newborn A1, the smallest of the Smallframes, Unisys now gives you a clear, continuous growth path of more than 100 times in computing power.

That means if you're running a small business or department with the A1, you can use proven mainframe software on a computer that costs about the same as a mini. And because the A1 is part of a broad line of compatible machines, your data and software investments are safe as you grow.

Meet the family.

The A1, A4 & A6 are the youngest and smallest members of the respected Unisys family of A Series mainframes. The series includes machines that run major banks, governments, schools, hospitals and businesses all over the world. An independent survey of mainframe owners found Unisys systems scored the highest five year average in overall satisfaction.*

While Smallframes are about the size and price of minis, the top of the A Series isn't a set of minicomputers playing together. It's the A15, one of the largest and most powerful true mainframes money can buy.

Between the A15 and the A1, there are 12 other models.

**Computerworld*, June 15, 1987, survey by Datapro Research Corporation.

All compatible over the line—and over time. Software written for any model or generation over the last 17 years is compatible with any current A Series model.

Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

Doesn't cost much.

You already know the A1 gives you mainframe quality for about the price of a mini.

But what about the rest of the A Series? From the moment of conception, every computer in the family is designed to be easy to get along with and cost very little to run.

That means reasonable purchase price. Low operating costs. Low training costs. Even low software development costs, thanks to the powerful A Series operating system and LINC—the well-known fourth generation language from Unisys that can cut programming time by a factor of ten or more.

Grandpa's eyes.

All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

So whether you want a small computer with a virtually unlimited conversion-free expansion path, or you've got a large Unisys computer and need a smaller yet fully compatible department level system, call the proud parents at Unisys.

We'd love to stop by with all the information you need. And show you pictures. After all, a new arrival like this is worth celebrating.

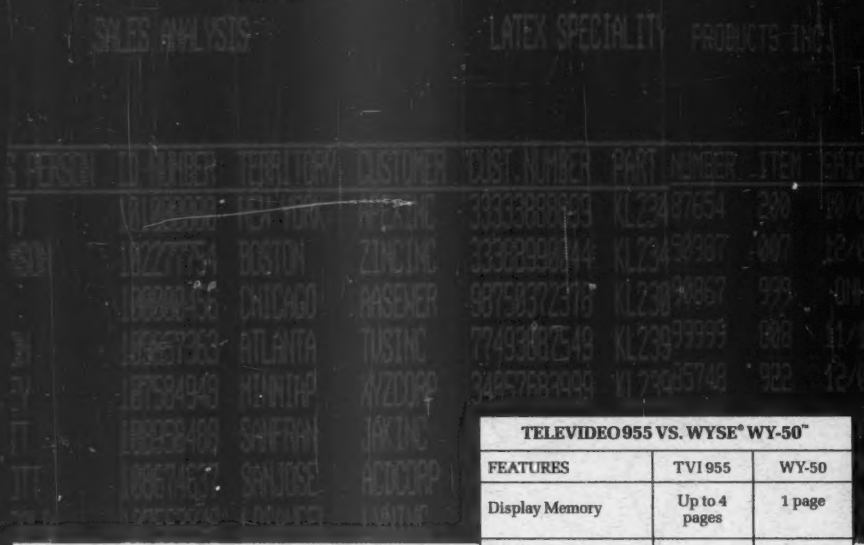
UNISYS
The power of 2

Call 1-800-547-8362, extension 50.
Unisys and innovation.
The power of 2.

The TeleVideo 955. Seeing is believing.

WYSE WY-50
(Unretouched photo)

TELEVIDEO 955
(Unretouched photo)



TELEVIDEO 955 VS. WYSE® WY-50™		
FEATURES	TVI 955	WY-50
Display Memory	Up to 4 pages	1 page
Programmable function keys	64	32
Dynamically allocated non-volatile function key memory	512	128
Maximum non-volatile bytes per function key	256	4
High contrast super dark Matsushita screen	Yes	No
List price	$499	$499

Sure, most $500 terminals can scrunch 132 columns onto a 14" screen. But you need a magnifying glass to read them.

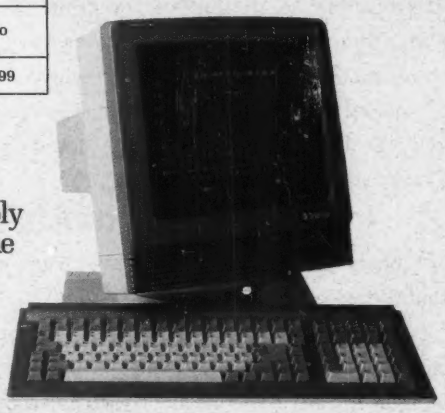
Not so with the TeleVideo® 955. We redesigned the proportion of our characters and put more space between them. And put them on a high contrast, super dark screen. The result is the most readable 132 column ASCII display available.

But there's more to the 955 than meets the eye.

Like our tilt-and-swivel positioning. The screen rotates through a full 270 degrees right and left, and from −5 to +15 degrees up and down. (Which makes backs and necks feel a lot better.)

We put all this in a machine with an incredibly small 9"x12" footprint. The result is a terminal that meets all the human factors standards recommended for adoption by the American National Standards Institute. All that, plus TeleVideo's full one-year end-user warranty.

Call us toll-free or write today, for more information.
TeleVideo Systems, Inc., 1170 Morse Avenue, Sunnyvale, CA 94088-3568.



TeleVideo®
THE VISION YOU NEED TO SUCCEED

Call 1-800-835-3228

© 1987 TeleVideo Systems, Inc. WYSE is a registered trademark, WY-50 is a trademark of Wyse Technology.

Hacker

CONTINUED FROM PAGE 79

him and Arzate two years of 12-hour days, six days a week. In 1983, there was no MIS support for PCs, so the duo handled the installation and training themselves.

But for someone who's done everything the hard way, Winckler today is described by his coworkers and business associates as a "forward thinker." With neither an MBA nor a bachelor's degree, Winckler is responsible for designing systems that will enable External Affairs to communicate better.

The 25-year Pacific Telesis veteran started with the company at the bottom as a frame man. He later joined the Navy, working as an electronic technician, where he installed and ran the first closed-circuit television station on board a ship. When he got out of the service, he went back to his former employer part-time and got an associate's degree in business administration from Los Angeles Valley College.

Winckler then went to work in the switch room, a job that has since been computerized, and later moved into managerial positions, joining Community Relations in 1979, which became External Affairs a year later.

Along the way, he figures he has accrued about 100 hours in college-level courses, with a mix of management and technical subjects.

Not a stereotypical executive

Winckler may not fit the caricature of a pin-striped, yellow-tied MBA, but he brings to his position a combination of good judgment, flexibility and a willingness to learn — all keys to his success as a manager.

"Once he has developed respect for your capabilities, he is willing to work with you and not sit back and question everything you do. He admits what he doesn't know and lets you run with the ball," says Mark Freund, vice-president of marketing for Interconnect Network Consulting Group, Inc. in Pasadena, Calif.

"He really knows how to handle a budget," says coworker John Donner, director of corporate communications. Donner notes that Winckler invariably has the documentation to prove cost savings attributable to automation.

Presentation creation is one area Winckler jumped into early, saving the Administrative Services department $120,000 from one year to the next.

Sees himself as a manager

Even if others on the staff today see Winckler as a "techie," he sees himself, above all, as a manager. "If you're to survive in a management job, you've got to make the equipment work," he says.

He readily admits that his own style of management is borrowed lock, stock and barrel from his immediate superior, Gerry Foster.

"I think it's very important when you give an assignment that you tell them your expectations and then let them do it. I trust people. I like to have people around me who are willing to tell me if I have a dumb idea. I don't get mad. I say 'Thanks,' " Winckler says.

"He's a good example of being self-managed," coworker Donner says. "He's not sitting around waiting for someone to give him direction. He's out there looking and studying and hiring consultants to accomplish his goals."

Donner also credits Winckler with making sure — to the point of distraction at times — that equipment meets the needs of his users. "He has done extensive user surveys, to the point where we'd have liked to have thrown him and his consultant out of our office, they kept bugging us so much."

Winckler obviously cannot be everywhere or do everything, so he relies on technology-oriented individuals, one of whom can be found in just about every department — people not unlike himself.

"Those people keep an operation running, and there's always one in every group," he says. "If you take a new person and throw him in front of a terminal,

Continued on page 90

Check's in the mail

Over the years, the Pacific Telesis Group's Chuck Winckler has done his share of product research, testing and contracting and has had his share of hassles with suppliers.

In the early days, forced to do a lot of legwork looking for information, he quickly learned two axioms: Things are not always what they appear to be, and seeing is believing.

"I'm a true believer in 'Show me, don't tell me,' in my operation," Winckler says. There is not much point in seeing a product demonstrated at the vendor's site, he adds. There, it will probably work under any circumstances. Instead, Winckler insists on live testing in his shop. "You'll find out real quick at your place whether it works."

A skeptic, Winckler rattles off a handful of phrases guaranteed to set off his internal "oh-oh" alarm:

- User-friendly — "I've yet to find a manual that was user-friendly; They always just happen to leave something out."
- Artificial intelligence — "That whole issue is still out for debate."
- "Relational" data bases — He says he has yet to encounter one that is.
- "We forgot to tell you, but it'll only cost ya . . . ." Managers have to be very careful of that, he warns.
- Newer, faster — "I don't think I should put in new computers just because they are new. The old ones are fast enough; Most people don't use their computers to their full capacity today."
- Vaporware — " 'It'll be out next month.' That's another good one."

"There're a lot of people out there trying to convince a lot of others that they know what they are talking about. It only takes once to be told to do something and then get taken for $10,000," he says.

To avoid these kinds of mistakes, he says, it is incumbent on managers to make sure they know what they are talking about before they recommend a system.

PATRICIA KEEFE

FREE SEMINAR ON TOOLS TO EXPLOIT THE POWER OF SQL/DS

If you have SQL/DS installed at your location, or are considering SQL/DS, the VMSQL seminar is three hours you won't want to miss.

Each seminar is packed with information designed to help you get the most power from SQL/DS. An overview of the SQL/DS environment will be given, followed by specific information on subjects such as editing tables, building data-entry applications and creating sophisticated reports.

LOCATIONS AND DATES

Boston, MA	October 28
Chicago, IL	October 6
Houston, TX	October 7
Los Angeles, CA	October 14
New York, NY	October 21
San Francisco, CA	October 13
Toronto, ON	October 20
Washington, DC	October 29

WHO SHOULD ATTEND

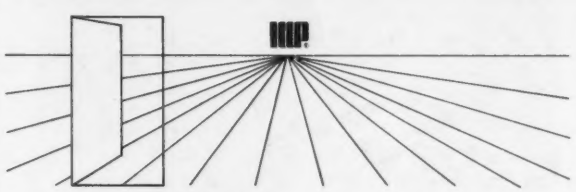
Database Administrators
Information Center Managers
Database Programmers
Data Processing Management
And anyone else who works with or manages SQL/DS databases.

Call Applied Relational Technology at 800-562-7100 or 703-264-8000

Applied Relational Technology is a division of VM Software, Inc.

1-CWX-870928

RESERVE YOUR PLACE TODAY
CALL 800-562-7100 OR 703-264-8000



Beyond Today. Your Career Horizon is as Unlimited as Your Dedication to the Profession.

Certification Will Prepare You for Today and Tomorrow!

Tomorrow comes too soon for computer professionals. Prepare yourself. Take an ICCP certification examination. The Institute for Certification of Computer Professionals is recognized by business, government, industry and most computer associations and societies.

ICCP offers certification programs that match your specific needs. The examinations can provide you the insights to see over the horizon and a measure of what's needed to succeed in facing the challenges of the future.

And through ICCP recertification, your accomplishments are kept fresh, up-to-date and credible in tomorrow's changing world of technological advancements and increased competitiveness.

For more details, call 312-299-4227 or fill in coupon and mail today.

Exam Date
November 14, 1987
Application Deadline
October 16, 1987

Complete and send coupon to: ICCP, 2200 East Devon Ave., Suite 268, Des Plaines, IL 60018.

☐ Please send information on Certification programs

Name

Street Address

City/State-Prov./Zip-Postal Code

Telephone

ABC 12345

Education

CONTINUED FROM PAGE 79

lion's share of new spending. Their slice of the pie will shrink. But they won't go away.

Consider railroads. Their share of the transportation market has dropped. Most of us no longer travel cross-country by train. But despite the availability of air transportation, interstate highways and teleconferencing, there are still needs best met by railroads.

Railroading may not have the glamour it did in 1887 or 1937. But, a quarter of a century into the jet age, a lot of people are doing quite nicely managing railroad operations and introducing new technology. There will still be a lot of them 25 or 50 years from now.

PEOPLE can adapt. Old dogs can learn new tricks. . . . People who want to adapt must recognize the new skills they need and proceed to get them.

Second, remember that people can adapt. Old dogs can learn new tricks. Not all blacksmiths became automobile mechanics, but many became good ones. People who want to adapt must recognize the new skills they need and proceed to get them.

What are these skills? Business skills. Aligning information processing with business requires an understanding of both fields. The MIS executive must know what a balance sheet is, what goes into it and why. "Cost of capital" and "cash flow from depreciation" must make sense. Marketing concepts, both generic ones like positioning and specialized ones that apply to a specific industry, must be familiar.

Basic economics is essential. Michael Porter's five sources of competitive impact should be second nature. In a manufacturing firm, the ideas of just-in-time manufacturing and quality-control theory are basic. (Who was Edward Deming? What did he do? Where did he do it? Why did he do it there?) The list goes on.

Learning without business school

These can be learned. The traditional approach is to go to business school for an MBA. Part-time programs fit many people's schedules. Employers often subsidize the tuition. But getting an MBA isn't right for everyone. People who want to learn can also do the following:

- Talk. The MIS manager should talk to managers of other functions about what they do, why they do it and what they have to know to do it well. Most will be delighted to be asked, as long as the visitor doesn't demand 200 hours at the year-end crunch. Talking won't do the job by itself since managers don't have time to teach every DP type who walks into their office bearing gifts of doughnuts. But it's part of the answer.
- Read books. Good books about business are available in local libraries, corporate libraries and business sections of well-stocked commercial and college bookstores. Colleagues can help with rough spots.
- Take short courses and attend seminars. Topics such as "Accounting for the Nonfinancial Executive" are a staple of most adult education and management training programs. These courses are geared for people who don't have the time for a full MBA program but do want to learn about a topic. Where they fit a person's schedule and cover a useful subject, these courses should be considered.
- Read trade periodicals. Every industry and functional specialty has newspapers and magazines, just as MIS does. Reading them will familiarize an executive with the key issues of an industry or profession. Many magazines and newspapers cover new developments in depth. The MIS executive who takes the time to understand the articles can discuss their implications on a peer-to-peer basis with other managers in the firm.
- Think and question. There is no magic about the intelligent use of information. Think of the business purpose behind every application and what might accomplish this purpose more effectively. Look at the information in a data base and ask what other purposes it could serve. Use words and phrases such as "why," "why not," "what else" and "what if."
- Realign. Many MIS executives have primary loyalty to the information systems profession. Their firm or industry is a distant second. It's fine for an MIS director to recognize that his next position is unlikely to be marketing vice-president. That's reality. But business thinking means putting the business first. This is no more and no less than employers expect of other executives.

The product of this effort will be a new person. Instead of an MIS executive who happens to work in industry X, there will be an industry X executive who happens to specialize in information systems. That is the key to dealing with the information systems of the future, to helping a firm use information, to becoming a chief information officer. Those who make this transition successfully will be the information systems leaders of the 21st century.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.

VIDEO-BASED TRAINING

For Your Free Demonstration Package, or courseware catalog, call:
(800) 323-8649
or
(312) 987-4084

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave.
Chicago, IL 60604

UNIX®/XENIX™
UNIX Executive Perspective
UNIX Overview
UNIX Fundamentals for Programmers
UNIX Shell
vi Editor
UNIX System V Internals

'C' Language
'C' Language Programming
Advanced 'C' Programming

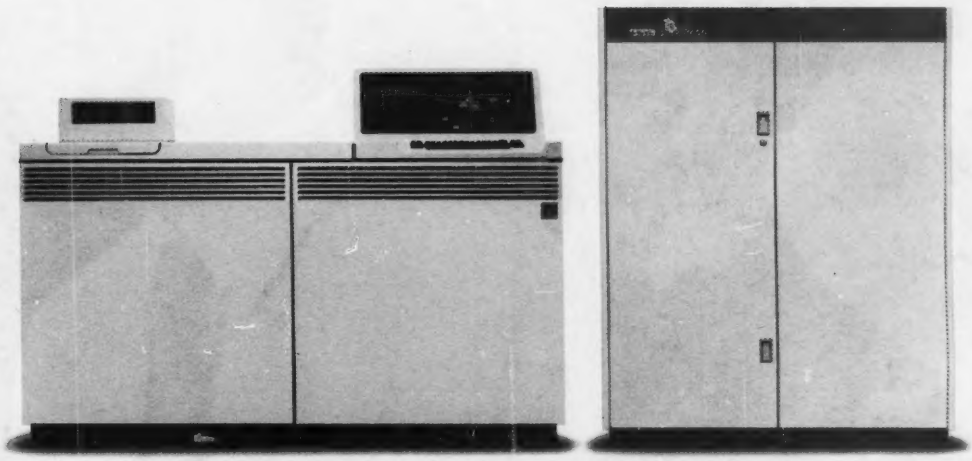
DEC
VAX/VMS for Programmers
VAX/VMS for Users

PC
PC Primer
MS-DOS
Lotus 1-2-3
dBase III
dBase III Plus
R:Base 5000
Multimate
Multiplan
Symphony
Displaywrite
Word Perfect
Enable

System/38
Introduction to S/38
Workstation Operator Training
Application Development Fundamentals
Query for Users
Text Management for Users

Ada

®UNIX is a trademark of AT&T Bell Laboratories.
™XENIX is a trademark of Microsoft.



EIGHT YEARS AGO, WE SAW THAT THEIR POTENTIAL WAS ANYTHING BUT MINI.

Today everyone's on the minicomputer bandwagon. But the mini wasn't always fashionable.

Eight years ago, we were a lonely voice in the crowd. Quietly developing the financial software, service and support for the day when minicomputers would become a major force in the corporate flow of business information.

Now that day is here. It seems like it happened almost overnight.

But for the benefit of those minicomputer users who are presently evaluating software vendors, we'd like to point out a few things that didn't happen overnight. Good things people automatically enjoy when they do business with McCormack & Dodge.

Our minicomputer products have stood the test of time. All over the world, they've shown they can deliver the same outstanding results as M&D mainframe software.

What's more, our systems are supported worldwide by top minicomputer professionals – seasoned application, technical, and training specialists.

And good as our products are, they perpetually get better. Enhancements flow regularly from a long-established R&D program, generously funded through Dun & Bradstreet resources.

With all the good hardware available, choosing your brand of minicomputer may be difficult.

Fortunately, your software choice is a whole lot easier.

McCormack & Dodge

a company of
The Dun & Bradstreet Corporation

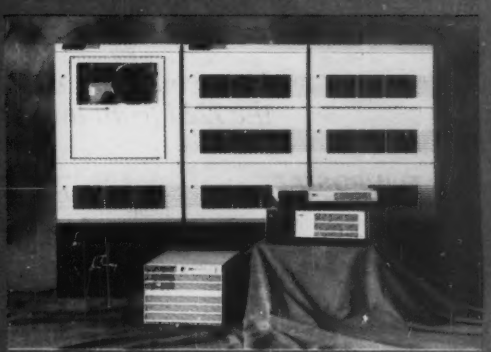
Financial, human resource, manufacturing, and application development software for multiple computing environments. Call 1-800-343-0325.

© 1987

"I'm told they don't throw many parties down in DP.

So I asked Doug to come up to ours. Doug's the real brains behind our new 3B system. He's the reason our computers can now talk to the IBM in Accounting and the DEC in Manufacturing. If you know anything about DP, that amounted to doing business across the Berlin Wall. Doug had a brainstorm and suggested AT&T. Their approach is standardizing communications between different systems. I don't have to tell you that's opened some doors around here. We owe Doug a lot.

AT&T comes through."



The AT&T 3B Computers

AT&T now offers a full line of departmental workgroup computers serving up to 300 users. A rich library of system and applications software includes host connectivity, development tools, programming languages, database management, OA, and a world of other UNIX® System programs.

LAN standards: Interfaces to Ethernet*, AT&T ISN, STARLAN Network, DECnet** and more put different departments in touch.

Industry standards including IBM† 3270, SNA†, BSC and X.25 link mainframe, midrange and micro environments.

Communications software moves data transparently between applications via packages like LU 6.2, AT&T Document Exchange and others. For the full story on AT&T's surprising 3B Computers, call now: 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

*Ethernet is a trademark of Xerox Corp.
**DECnet is a registered trademark of Digital Equipment Corp.
†IBM is a registered trademark and SNA is a trademark of International Business Machines Corp.
©1987 AT&T.

AT&T
The right choice.

Hacker

CONTINUED FROM PAGE 85

he's scared to death. But if there's someone out there willing to show that person, it really makes a difference on the learning curve."

For those users who want to take a more formal approach to learning, he suggests that they spend 10% of their time educating themselves.

Winckler has lived out this philosophy. He figures he spends eight hours a week working with Foster on the California Education Technology Committee, which is putting together a five-year plan on how technology can be used in the state's schools.

Also, he works on the technology committee of the Central City Association of Los Angeles, which examines how technology — telecommuting, for example — can be used to solve the city's problems.

International recognition

In addition, a team that included Winckler took second place last year in an international competition to design a city of the future. The yearlong project involved designing Kawasaki, Japan, for the year 2000.

Donner, who contributed to the Japanese project, sees Winckler's extracurricular activities as being beneficial to the corporation. Committee work also gives Winckler an avenue through which he can share with others the role that communications can play and some of the problems Pacific Telesis can address, Donner says.

Blue-sky brainstorming over high-level strategic issues on these outside committees also serves to provide added perspective when Winckler comes back down to earth and attempts to deal with problems in his own environment, says Freund, who worked as a consultant with Winckler on a project to network External Affairs.

But Winckler emphasizes that MIS managers also have to understand the department manager's job, which too often they do not.

"When they don't, users go out and get what they need another way," he says. "People are too creative these days. Hell, that's what I did."

IBM 3270 and System/34/36/38 Users:

100% IBM 4224 Compatible!

Now you have an alternative — the 7224 from Interface Systems.

Full IPDS/APF Support

The plug-compatible ISI 7224 prints everything an IBM 4224 can print . . . and more. Speeds reach 400 cps draft, 200 cps DP Text, and 100 cps NLQ. You can also print graphics and bar codes using IPDS or APF. Output can be in black or up to eight colors.

3 Forms-Handling Options in 1

The ISI 7224's standard "push" tractors handle continuous, demand-document, and single-sheet forms — you don't need to change tractors for each. Automatic paper loading/parking saves time and trouble. Bottom-feed plus optional "pull"tractors provide a straight path for stiff forms.

No Need to Waste Forms

The ISI 7224 provides no-waste demand-document tear-off. Forms can have up to six parts.

No Box! Just Plug It In and Print

Fully integrated, the ISI 7224 connects directly to IBM 3174/3274/3276 controllers or S/3X twinaxial cable. It can replace IBM's 3287,3268, and 4214 printers, plus others, in addition to the 4224. An enhanced 4224-compatible control panel and two-line, 32-character LCD make operation easy.

Low Noise, Low Profile, Low Price

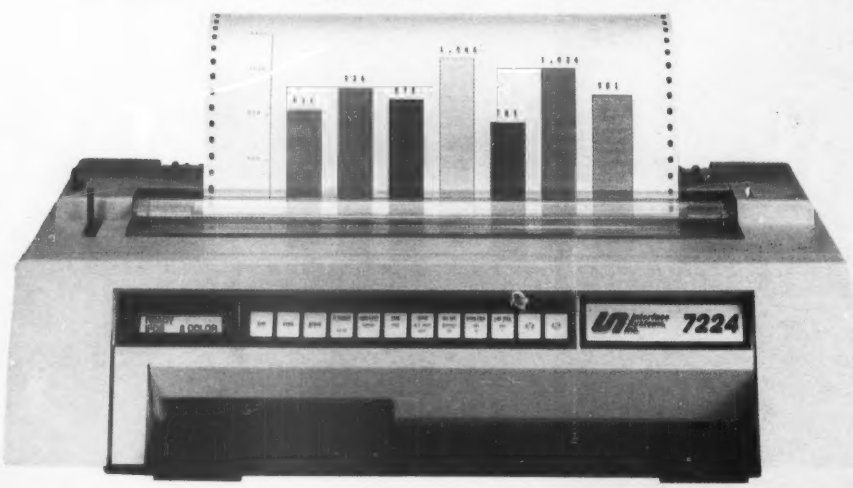
The ISI 7224 prints at 53.7 dBA — quieter than the 4224. And since it's only seven inches tall, it fits tighter spaces. Extra features and all, it costs significantly less.

1-800-544-4072

Call today for more information (in Michigan, 313/769-5900). Or write to us at 5855 Interface Drive, Ann Arbor, MI 48103. Telex: 810-223-6058.

Interface Systems, Inc.

Problem-Solving Printers for IBM Systems



CALENDAR

OCT. 1-10

Financial Networks Workshop. Chicago, Oct. 4-6 — Contact: Ed Alwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

North American Banis User Group's 1987 Roundtable. Orlando, Fla., Oct. 4-7 — Contact: Robert Forbetz, Forum Central Users Group, Monsanto Co., St. Louis, Mo.

CADRE '87: Annual Complete ADR Environment User Group Meeting. Las Vegas, Oct. 4-8 — Contact: Allen Haggar, Applied Data Research, Inc., Rt. 206 and Orchard Road, Princeton, N.J. 08543.

Second Annual Conference on Object-Oriented Programming Systems, Languages and Applications. Kissimmee, Fla., Oct. 4-8 — Contact: OOPSLA '87, P.O. Box 3845, Portland, Ore. 97208.

AUUA, Inc. (Sperry users) Fall Conference. Seattle, Oct. 4-9 — Contact: Randal L. Leonard, Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

Software Contracts. Chicago, Oct. 5-6 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105.

Third Party Maintenance. San Francisco, Oct. 5-6 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Strategic Issues in Managing Information Technology. Boston, Oct. 5-7 — Contact: Decision Support Technology, Inc., Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Comten Users' Exchange Fall Conference. Seattle, Oct. 5-9 — Contact: Dave Beran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Third Annual PDOS Interest Group Conference. Boston, Oct. 5-9 — Contact: Eyring Research Institute, Inc., 1455 W. 820 St. N., Provo, Utah 84601.

Feedback '87, 12th Annual DSSD User's Conference. Kansas City, Mo., Oct. 6-8 — Contact: Data Systems Structured Development, Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

AVIOS '87 Conference. Alexandria, Va., Oct. 6-8 — Contact: Leon Lerman, American Voice Inprit/Output Society, P.O. Box 60940, Palo Alto, Calif. 94036.

Fall Meeting of the Life Insurance Systems Association. Indianapolis, Oct. 6-9 — Contact: Valerie K. Tamblyn, Life Insurance Systems Association, Indianapolis Life Insurance, P.O. Box 1230, Indianapolis, Ind. 46206.

Banyan User Group Meeting. Newport, R.I., Oct. 7-9 — Contact: Banyan Systems, Inc., 115 Flanders Road, Westboro, Mass. 01581.

Electronic Messaging '87. San Francisco, Oct. 8-9 — Contact: Electronic Mail Association, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Fourth Annual Computer Graphics Workshop. Cambridge, Mass., Oct. 8-9 — Contact: Judy DesHarnais, Usenix Conference Office, P.O. Box 385, 16951 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Ami Expo. New York, Oct. 10-12 — Contact: Ami Expo Headquarters, Suite 301, 211 E. 43rd St., New York, N.Y. 10017.

OCT. 11-17

Software Publishers Association's Third Annual Conference: Exploring New Frontiers in Software. Cambridge, Mass., Oct. 11-14 — Contact: SPA, Suite 901, 1101 Connecticut Ave. N.W., Washington, D.C. 20036.

Society for Information Management's 19th Annual Conference. Seattle, Oct. 11-15 — Contact: Kathleen Niles, SIM Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Smart Card Applications and Technologies Conference. Atlantic City, Oct. 12-14 — Contact: The Information Exchange, Suite B, 15269 Mimosa, Dumfries, Va. 22026.

FMS '87: Flexible Manufacturing Systems. Long Beach, Calif., Oct. 12-15 — Contact: Special Programs Division, Computer and Automated Systems Association/Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Continued on page 93

CN 88 Network your way to success!

Learn from one of the nation's leading telecommunications professionals — attend an In-depth Tutorial at CN '88!

Communication Networks '88

Place: Washington D.C. Convention Center
Tutorials: Monday, Jan. 25
Conference & Expo: Tuesday-Thursday, Jan. 26-28

CN '88 — your network for success

Celebrating a decade as the industry's elite voice and data show. This year's Communication Networks will be the biggest show ever. In an exciting atmosphere of new product introductions, late-breaking news, exhibits, demonstrations and 75 hour-long conference sessions, you'll get the latest word on all aspects of voice, data, and telecommunications equipment, services, software and management solutions.

Most important of all, CN '88 provides your best educational opportunity of the year. CN's full-day, university-level tutorials help you bridge the gap between today's rapidly emerging technical and managerial possibilities and your ability to put them to work for you.

No matter what level of experience you have, you'll find the basic or advanced tutorial you need. Led by a top telecom professional, each tutorial gives you knowledge it would take years of trial-and-error to learn on your own. Plus, completion of a tutorial qualifies you for Continuing Education Credits and certificate.

Register now to guarantee your place at the tutorial of your choice. Complete this enrollment form and mail it today!

Last year's tutorials were filled to capacity. Don't risk disappointment. Register now!

Make your success a priority in 1988. Choose the tutorial now that will profit you the most.

For immediate information call (800) 225-4698

T-1 PLANNING INTEGRATED CORPORATE NETWORKS

Leader: Dr. John McQuillan, President, McQuillan Consulting

This intensive, one-day seminar instructs you on planning issues for integrating packet, circuit, and channel switching; SNA and X.25; and voice and data in a corporate network strategy. You will address the role ISDN will play, as well as enterprise-wide networking and bandwidth-intensive applications.
Level: Intermediate.

T-2 MULTIVENDOR MULTIARCHITECTURE LANS: MAKING THEM WORK

Leader: Dr. Kenneth Thurber, President, Architecture Technology

Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs.
Level: Advanced.

T-3 ISDN: STANDARDS, PRODUCTS AND SERVICES

Leader: James G. Herman, Independent Consultant, formerly with the Telecommunications Consulting Group at BBN

ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years.
Level: Intermediate.

T-4 MULTIVENDOR NETWORK MANAGEMENT

Leader: Jerry McDowell, Vice President, Vanguard Telecommunications Inc.

Enroll in this intensive tutorial for skills in managing a network which links multiple carriers, including those on the same circuit, and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service.
Level: Intermediate.

T-5 HOW TO BECOME A BETTER TELECOMMUNICATIONS MANAGER

Leader: Gerald P. Ryan, President, Connections Telecommunications Inc.

Today's network manager must understand not only new technologies and standards, but must play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency.
Level: Intermediate.

T-6 THE LATEST LOOK AT NETWORK STANDARDS AND OSI

Leader: Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.

As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements.
Level: Introductory.

T-7 MODELING AND DESIGNING VOICE AND DATA NETWORKS

Leader: Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University

Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems, plus cost-efficiency issues and other practical considerations.
Level: Advanced.

T-8 NETVIEW: INDUSTRY-WIDE IMPLICATIONS

Leader: Atul Kapoor, Vice President, Kaptronix Inc.

This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependences and functional interactions, plus an analysis of their impact on the industry, significance for users and practical suggestions for implementation.
Level: Intermediate.

T-9 OPEN NETWORK ARCHITECTURE: CARRIER VENDOR USER IMPLICATIONS

Leader: Haines Gaffner, President, LINK Resources Corp.

The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be.
Level: Intermediate.

T-10 INTERNATIONAL NETWORKS: SOLVING THE PRACTICAL PROBLEMS

Leader: Len Effenbein, President, Telcom Systems Group

Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed.
Level: Intermediate.

T-11 BUILDING THE NETWORK CONTROL CENTER

Leader: Gabe Kasperek, President, Kazcom Inc.

This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network.
Level: Introductory.

T-12 REGULATORY ISSUES AND ANSWERS

Leader: Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social and regulatory issues; the evolution of vendor technology and industry standards and significant developments affecting the coming regulatory year.
Level: Intermediate.

T-13 INTRODUCTION TO DATA COMMUNICATIONS

Leader: Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry.
Level: Introductory.

T-14 INTRODUCTION TO VOICE COMMUNICATIONS AND PBX

Leader: James Morgan, Principal, J.H. Morgan Consultants

Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs, and services, as well as an overview of traffic engineering.
Level: Introductory.

T-15 IMPACT OF THE NEW POST-DIVESTITURE TARIFFS ON LARGE NETWORKS

Leader: Robert L. Ellis, President, The Aries Group

In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how to use them.
Level: Intermediate.

Choose one and indicate tutorial number:

☐ All four days at CN '88, including one In-depth Tutorial (Jan. 25) indicated below and full admission to the three-day Conference and Expo (Jan. 26-28) including seminars and exhibits.
In-depth Tutorial No. T-____ $695.00

☐ The three-day Conference and Expo (Jan. 26-28). $495.00

☐ The all-day In-depth Tutorial (Jan. 25) indicated below, including admission to exhibits (Jan. 26-28).
In-depth Tutorial No. T-____ $295.00

☐ One day at CN '88, including admission to the Conference and Expo. Reserve space for me on:
Tues. Wed. Thurs. $195.00
Circle one

☐ Please send me more information on Communication Networks

Card No. _____

Expiration Date _____

Signature _____

☐ Check enclosed ☐ Bill me ☐ Bill company P.O. #

☐ American Express ☐ MasterCard ☐ VISA

Name _____

Title _____

Company _____

Street _____

City _____ State ____ Zip ____

Telephone ( ) _____ Ext ____

Note: All prices include lunch. NWWB CWB

Return Registration Form to: CN '88, P.O. Box 9171, Framingham, MA 01701-9171. Or call TOLL FREE 800-225-4698.

LOCAL HAPPENINGS

NORTHEAST

Newton, Mass., Oct. 6. EDP Auditors Association, Inc., New England Chapter. Disaster Recovery, with Gerald Isaccson of Information Security Services, and The Information Processing World, with Bill Laberis of *Computerworld*. Days Inn, 399 Grove St. 2:30 p.m. and 5 p.m. Contact: EDPAA, P.O. Box 516, Boston, Mass. 02102.

Northport, N.Y., Oct. 13. Suffolk County Chapter of the Data Processing Management Association (DPMA). Performance Monitoring and Systems Capacity Planning. Windjammer Restaurant, Rt. 25A. 6 p.m. Contact: Monika MacLean, 257 Depot Road, Huntington Station, N.Y. 11746.

Newton, Mass., Oct. 14. Society for Information Management, Boston Chapter. Monthly meeting. Newton Marriott. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

New York, Oct. 14. DPMA Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 6:30 p.m. Contact: Dick Lefkon, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing, New York Chapter. Annual Fall Reception.Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y. 10163.

Harrisburg, Pa., Oct. 14. Association for Systems Management (ASM), Central Pennsylvania Chapter. Tour of Harrisburg DP center. City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

West Hartford, Conn., Oct. 15. Black Data Processing Associates, Hartford Chapter. Voice and Data Integration. Hartford Insurance Group, 235 Fern St. 5:30 p.m. Contact: BDPA, P.O. Box 2522, Hartford, Conn. 06146.

Boston, Oct. 16. Society for the Management of Professional Computing. Monthly meeting. Anthony's Pier 4 Restaurant. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

Boston, Oct. 21. DPMA, Boston Chapter. Facilitator-based Information Gathering, with Jerry Erwin of Technology Information Products Corp. Anthony's Pier 4 Restaurant. 5:30 p.m. Contact: DPMA, P.O. Box 1806, Boston, Mass. 02105.

Augusta, Maine, Oct. 21. Maine Pine Tree Chapter of the DPMA. People Skills, with Sally Harwood of the University of Maine. The Senator Inn. 5 p.m. Contact: J. Fieweger, Delta Chemicals, Inc., Searsport, Maine 04974.

SOUTHEAST

Chamblee, Ga., Oct. 13. ASM, Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Oct. 15. ASM, Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Macon, Ga., Oct. 20. DPMA, Middle Georgia Chapter. Stress Management, with Nancy Ridley of Charter Northside. Holiday Inn, Interstate 75. Contact: L. L. Purcell, P.O. Box 4, Macon, Ga. 31202.

Lafayette, La., Oct. 22. The Acadiana Chapter of the DPMA. Monthly meeting. Evangeline Steak House, Highway 167 S. 6:30 p.m. Contact: Debra Billeaud, Guaranty Bank and Trust Co., Fourth Floor, 200 W. Congress St., Lafayette, La. 70502.

Myrtle Beach, S.C., Oct. 22-23. Hewlett-Packard Middle Atlantic Regional Users Group. Fall quarterly meeting: MIS and Financial Management Systems. Ocean Dunes Hotel. Contact: Stephen Day, Union Camp Corp., Box 178, Franklin, Va. 23851.

MIDWEST

Lafayette, Ind., Oct. 8. DPMA, Segamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Painter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS Department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Minneapolis, Oct. 8. The Minnesota Intellectual Property Law Association. Software Copyright Infringement: The Emerging Standard. Whitney Hotel, 150 Portland Ave. 1 p.m. Contact: Walter Linder, Suite 1500, 625 4th Ave. S., Minneapolis, Minn. 55415.

Des Moines, Iowa, Oct. 12. Des Moines Chapter of the ASM. (Bosses' night). Constructive Methods of Conflict Resolution and Motivation of DP Professionals, with Roy Park, management consultant. The Howard Johnson Inn, Merle Hay Road. 5 p.m. Contact: Joleen Montag, Integrated Resources Life Insurance Co., 3737 Westown Pkwy., West Des Moines, Iowa 50265.

Kalamazoo, Mich., Oct. 14. Southwestern Michigan Chapter of DPMA. Taking the Disaster Out of Disaster Recovery, with Scott Sarison of Corporate Contingency Services. The Black Swan Restaurant. 6:30 p.m. Contact: William Hosken, The Upjohn Co., 7171 Portage Road, Kalamazoo, Mich. 49001.

Toledo, Ohio, Oct. 14. ASM, Toledo Chapter. Selling Ideas and Change to Management, with Ken J. Shoa of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Indianapolis, Oct. 15. Central Indiana Chapter of the Association for Computing Machinery. Artificial Intelligence in the Real World, with Jim Crosby of GTE MTO, Inc. Howard Johnson Downtown, 501 W. Washington St. 6 p.m. Contact: Don Boner, 957 West Drive, Woodruff Place, Indianapolis, Ind. 46201.

Dayton, Ohio, Oct. 20. Megacity Chapter of the ASM. Computer Security and Business Concerns. Dayton Marriott, 1414 S. Patterson Blvd. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2324 Stanley Ave., Dayton, Ohio 45404.

Fort Wayne, Ind., Oct. 20. Fort Wayne Chapter of ASM. A View from the Top, CEO, CFO, with Walter S. Ainsworth of Phelps Dodge and Randolph Straka of Tokheim. Goeglein's, 7311 Maysville Road. Contact: ASM, Suite 103, 10427 Leo Road, Fort Wayne, Ind. 46825.

Des Moines, Iowa, Oct. 26-28. Iowa Computer Using Educators. ICUE Conference '87: Networking, Technology and Education. Howard Johnson's North. Contact: Barry Pitsch, Heartland Education Agency, 6500 Corporate Drive, Johnston, Iowa 50131.

Bloomington, Minn., Oct. 29. Minnesota Intellectual Property Law Association. International Patenting Strategy. Hotel Sofitel, 5601 W. 78th St. 9 a.m. Contact: Dianne Plunkett, 1919 University Ave., St. Paul, Minn. 55107.

WEST

Portland, Ore., Oct. 19-20. Effective Software Practices: The Fifth Annual Pacific Northwest Software Quality Conference. Sheraton Inn, Airport. Contact: Lawrence & Craig, Inc., P.O. Box 40244, Portland, Ore. 97240.

Walnut Creek, Calif., Oct. 21. ASM East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA, El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mbank Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

COMPUWARE CICS dBUG-AID

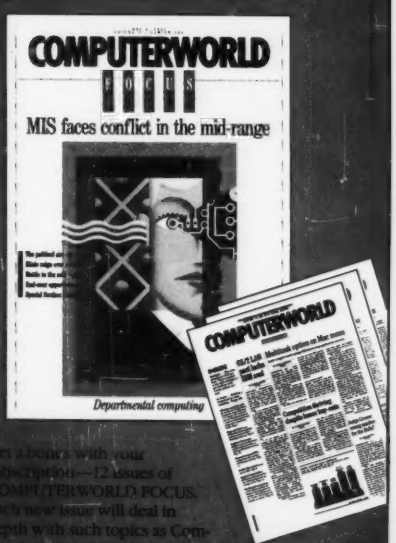
Find Program Errorrs Fast

If you didn't spot our errorr Compuware CICS dBUG-AID would. This versatile debugging and testing tool helps detect and isolate multiple program errors, logic errors, CICS transaction abends, even CICS storage violations. Fast. Because with CICS dBUG-AID, programmers can interactively view text one line of code at a time. And, its unique three-tier design enables the new user, as well as the more experienced programmer and systems programmer, to put CICS dBUG-AID to work immediately. With CICS dBUG-AID you can't go wrong. To find out more about CICS dBUG-AID, CICS Abend-AID, and Compuware CICS PLAYBACK, write or call us at: 32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan, (313) 540-0400.

COMPUWARE
Because experience is everything.

Compuware CICS dBUG-AID and CICS Abend-AID are registered trademarks of Compuware Corp. Compuware CICS PLAYBACK is a trademark of Compuware Corp. Copyright © 1987.

BONUS.



Get a bonus with your subscription—12 issues of COMPUTERWORLD FOCUS. Each new issue will deal in depth with such topics as Communications, Connectivity, Software and more. To subscribe, complete the order form and mail in this postage paid envelope. Or call 1-800-255-6286* for faster service.

*In NJ call 1-800-322-6286.

COMPUTERWORLD.
Keeping Up With Today. Anticipating Tomorrow.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 NEPTUNE, NJ 07754

POSTAGE WILL BE PAID BY ADDRESSEE

CIRCULATION DEPARTMENT

COMPUTERWORLD

P.O. Box 1565

Neptune, NJ 07754-9916

Continued from page 90

USE, Inc. Fall Conference (for Unisys Corp. Series 1100 users). Montreal, Oct. 12-16 — Contact: USE, Inc., Box 461, Bladensburg, Md. 20710.

Systems for Manufacturing Excellence '87. Long Beach, Calif., Oct. 12-16 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Vax Users Show, Exposition and Conference. Dallas, Oct. 13-14 — Contact: The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Scan-Tech 87. Kansas City, Mo., Oct. 13-15 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

Chem Com '87. New Orleans, Oct. 13-16 — Contact: Devon Buckler, The Synthetic Organic Chemical Manufacturers Association, Suite 300, 1330 Connecticut Ave. N.W., Washington, D.C. 20036.

System 3X Users Exposition and Conference. Atlanta, Oct. 14-15 — Contact: Systems 3X Users Show, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Second National Conference on Building and Operating Defect-Free Software. San Francisco, Oct. 14-16 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fifth Biennial IEEE Careers Conference: The Engineer's Life and Career in Today's World. San Diego, Oct. 14-16 — Contact: William R. Anderson, Institute of Electrical and Electronics Engineers, Suite 608, 1111 19th St. N.W., Washington, D.C. 20036.

Solutions for Today: TOP and GOSIP Profiles. Washington, D.C., Oct. 15-16 — Contact: Rebecca L. Alsup, Technical Activities Division, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Northeast Computer Faire. Boston, Oct. 15-17 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Printcom. Boston. Oct. 16-18 — Contact: Key Productions, Inc., 234 Murphy Road, Hartford, Conn. 06114.

OCT. 18-24

Techskills. Cincinnati, Oct. 18-21 — Contact: American Society for Training and Development, Box 1443, 1630 Duke St., Alexandria, Va. 22313.

Eastern Prime Users Group Conference. Philadelphia, Oct. 18-21 — Contact: Michael Muraca, c/o Eastern Prime Users Group, P.O. Box 3231, Boston, Mass. 02101.

International Data Corp. Fall Executive Conference — Systems Integration: The Business Challenge. Scottsdale, Ariz., Oct. 18-21 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fourth Annual Nomad Users Conference. New Orleans, Oct. 18-22 — Contact: Must Software International, 187 Danbury Road, Wilton, Conn. 06897.

International Tandem Users' Group 1987 Fall Conference. New Orleans, Oct. 18-22 — Contact: ITUG, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Financial Times Annual Electronic Financial Services Conference. London, Oct. 19-20 — Contact: International Business Conferences and Seminars, Minster House, Arthur St., London, England EC4R 9AX.

Hammer Forum 87 — Strategic Information Systems: The Technological Dimension. Cambridge, Mass., Oct. 19-21 — Contact: Hammer Forum 87, Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

Techconnect, The Wang Compatible Trade Show. Boston, Oct. 19-21 — Contact: Sandy Hoffman, Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

American Production and Inventory Control Society's 30th Annual Technical Exhibit. St. Louis, Oct. 19-22 — Contact: Stephanie Becker, APICS Technical Exhibit, P.O. Box 11480, Alexandria, Va. 22312.

CASExpo, The National Computer Aided Software Engineering Conference and Exposition. Washington, D.C., Oct. 19-22 — Contact: Hank Bowman, CASExpo, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

The Seventh National Symposium on EDP Quality Assurance. Washington, D.C., Oct. 19-22 — Contact: U.S. Professional Development Institute, EDP Quality Assurance Conference, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

14th Annual Conference of the North American Data General Users Group. Las Vegas, Oct. 19-22 — Contact: NADGUG, MS C-228, 4400 Computer Drive, Westboro, Mass. 01580.

The Third Annual Expert Systems in Government Conference. Washington, D.C., Oct. 19-23 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Workshop for Posix. Rockville, Md., Oct. 20-21 — Contact: Posix Workshop, Attn: Debbie Jackson, National Bureau of Standards, Room B-252, Building 225, Gaithersburg, Md. 20899.

Protext IV: The Fourth International Conference on Text Processing Systems. Boston, Oct. 20-22 — Contact: Paulene McKeever, Conference Management Services, P.O. Box 5, 51 Sandycove Road, Dun Laoghaire, Co. Dublin, Ireland.

Conference on Computers and Law. Santa Monica, Calif., Oct. 21-23 — Contact: Michael M. Krieger, P.O. Box 24619, Los Angeles, Calif. 90024.

CIM in the Process Industries. Oak Brook, Ill., Oct. 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Independent Computer Consultants Association National Fall Conference. Stamford, Conn., Oct. 23-25 — Contact: Tretter-Gorman, Inc., 711 N. 11th St., St. Louis, Mo. 63101.

Workshop on Computer-Assisted Map Analysis. Berkeley, Calif., Oct. 24-25 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

OCT. 25-31

Annual International Conference of the IRMX Operating System User's Group. Dallas, Oct. 25-27 — Contact: Intel Corp., 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97124.

24th Joint National Meeting of The Institute of Management Sciences. St. Louis, Oct. 25-27 — Contact: The Institute of Management Sciences, 290 Westminster St., Providence, R.I. 02903.

National-American Wholesale Grocers' Association's 1987 Productivity Conference. Chicago, Oct. 25-28 — Contact: NAWGA, 201 Park Washington Court, Falls Church, Va. 22046.

Sixth Annual System 1022/1032 Users Conference. Cambridge, Mass., Oct. 25-28 — Contact: Compuserve, Data Technologies, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

International UFO-Cobol/XE User Group's Annual Conference. Orlando, Fla., Oct. 25-28 — Contact: On-Line Software International, Inc., Fort Lee Executive Drive, Fort Lee, N.J. 07024.

Operations Exchange 87. San Diego, Oct. 25-28 — Contact: Lynn Ridgway, American Financial Services Association, 1101 Fourteenth St. N.W., Washington, D.C. 20005.

Microbanker Expo '87. Dallas, Oct. 25-28 — Contact: Jayne Shepro, Microbanker, Inc., P.O. Box 1508, York, Pa. 17405.

1987 Fall Joint Computer Conference. Dallas, Oct. 25-29 — Contact: The Computer Society of The Institute of Electrical and Electronics Engineers, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

VAX Business User Forum. New York, Oct. 26-28 — Contact: IDG Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

Corporate Electronic Publishing Systems Show and Conference. Boston, Oct. 26-28 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Data Entry Management Association Conference & Equipment Exposition. Boston, Oct. 26-28 — Contact: DEMA, 750 Summer St., Stamford, Conn. 06901.

CAM-I's 16th Annual Technical Conference and Member's Meeting: Computer Integrated Enterprise. Tarpon Springs, Fla., Oct. 26-28 — Contact: CAM-I Conference Services, Suite 1107, 611 Ryan Plaza, Arlington, Texas 76011.

Expert Systems: Getting Business Results From Applied AI. New York, Oct. 26-28 — Contact: Conference Registration Office, Decision Support Technology, 51 Church St., Boston, Mass. 02116.

Fourth Annual I-DEAS Users' Conference. Cincinnati, Oct. 26-29 — Contact: Structural Dynamics Research Corp., CAE International, 2000 Eastman Drive, Milford, Ohio 45150.

The Eleventh International Fiber Optic Communications and Local Area Networks Exposition. Anaheim, Calif., Oct. 26-30 — Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

The Fourth Annual Flat Information Display Conference. San Jose, Calif., Oct. 27-28 — Contact: International Planning Information, Inc., #1, 465 Convention Way, Redwood City, Calif. 94603.

The Fifth Professional Personal Computer Conference. London, Oct. 27-28 — Contact: Financial Times Conference Organization, International Business Conferences and Seminars, 2nd Floor, 126 Jermyn St., London, England SW1Y 4UJ.

Unix Expo. New York, Oct. 27-29 — Contact: National Expositions Co., Suite 12A, 49 W. 38 St., New York, N.Y. 10018.

Educom'87. Los Angeles, Oct. 27-30 — Contact: Educom '87, P.O. Box 364, Princeton, N.J. 08540.

International Biometric Association Seminar. San Francisco, Oct. 28 — Contact: International Biometric Association, Suite 800, 1001 Connecticut Ave. N.W., Washington, D.C. 20036.

Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Atlantic City, Oct. 28-30 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

Rothchild Consultants' TOC Conference on Optical Storage for Small Systems. Millbrae, Calif., Oct. 28-30 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

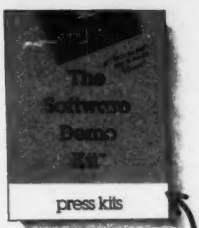
Computer Dealers and Lessors Association Joint Meeting with the European Computer Dealers and Lessors. Bermuda, Oct. 28-31 — Contact: CDLA, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

Bureautec'87. Luxembourg, Oct. 28-29 — Contact: Societe des Foires Internationales de Luxembourg, Rue Alphonse Weicker, 2721 Luxembourg-Kirchberg, Adresse postale: L-2088 Luxembourg.

Mumps Users' Group. Washington, D.C., Oct. 29-31 — Contact: Mumps Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

Ninth Annual Computer Law Institute. Washington, D.C., Oct. 29-31 — Contact: Practicing Law Institute, 810 Seventh Ave., New York, N.Y. 10019

NEW FROM PRESSKITS GET A FREE DEMONSTRATION OF THE BEST WAY TO MARKET SOFTWARE . . . THE DEMO KIT.™

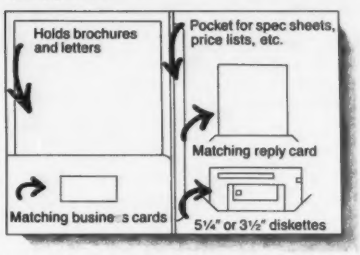


Standard size (9" x 12") high quality gloss stock

This is one of the most powerful software marketing tools ever designed . . . because the best way to sell software is to *demonstrate* it. In the past, it's been prohibitively expensive to put together a first-rate software demo package. Now, PressKits has done it for you, affordably.

Whether you're test marketing, direct marketing or using the Software Demo Kit as actual packaging, we think you'll see its advantages right away:

1. SIGNIFICANT SAVINGS; The total cost is very affordable. In larger quantities, the savings build even faster.
2. QUICK TURN-AROUND; we'll ship your order within 12 working days from the time we receive your artwork, not including proofing time.
3. QUALITY CONSTRUCTION; there's no higher quality presentation available, and it helps cut down on damaged or defective disks.


Holds brochures and letters
Pocket for spec sheets, price lists, etc.
Matching reply card
Matching business cards
5¼" or 3½" diskettes

The Software Demo Kit is the first *professional, functional* package commercially available. If you market software, you should consider the Software Demo Kit as a primary marketing tool to drive your sales. There's nothing else like it!

To get a quotation, more information or to place your order today, call toll-free outside Massachusetts 1-800-472-3497 (1-800-GRAFIXS). In Mass., call (617) 551-0709.

presskits

COUPON INFORMATION:
☐ Please send a sample with more information
☐ I need a quote right away—
have someone call me!
( ) _____ – _____

presskits
Chestnut Green
470 Washington St. Suite 4
Norwood, Ma. 02062
(617) 551-0709
Fax: (617) 769-7639

Name _____ Address _____
Title _____ City _____
Company _____ State _____ Zip _____
Software Product Involved: _____

©1987, Michael P. Crosson. All rights reserved. The Demo Kit and the Software Demo Kit are registered trademarks of Michael P. Crosson. Patent Pending. PressKits is a registered trademark of Ardmore Graphic Services, Inc.

PERSONAL COMPUTERS CAN'T WORK FOR YOU AFTER OCTOBER 2.

NOVEMBER'S COMPUTERWORLD FOCUS ON PERSONAL COMPUTERS CLOSES OCTOBER 2.

New personal computer technologies are being developed almost daily. And that complicates the lives of MIS/DP and other information systems professionals. Should they jump in and buy the latest technology . . . wait for future product developments . . . or simply upgrade existing systems?

In the November 4 *Computerworld Focus* on Personal Computers, over 125,000 paid subscribers and hundreds of thousands of pass-along readers will get an in-depth look at the newest PC trends. They'll also get helpful tips on implementation and a preview of vendor strategies. And that makes it the perfect time for them to get your PC product/service message, too.

In November we focus on PCs — and distribute bonus copies at Comdex/Fall.

Special section: Connectivity
A comprehensive section examines some of the hottest PC connectivity offerings for both short and long-term results: Mac connectivity to a multitude of vendors' products as well as PS/2 and OS/2 connectivity to — or multitasking with — larger systems.

PCs vs. mainframes
A discussion of *if* personal computers, including 386s, are actually replacing mainframes — where it's happening, when it's a good idea, and what pros and cons must be sorted out by information systems professionals.

The arrival of PS/2s
A survey of MIS managers tells it all — how they're getting ready for PS/2s, what they're expecting from the new machines, and how they plan to cope with disk conversion.

New Apple technologies
A look at what users can do with Apple's new Hypercard and Hypertext technology — and at how Apple and IBM offerings compare.

PC graphics
An analysis of this strong-selling market looks at the state of the art in PC graphics and examines the so-called "super-graphics" now available.

Laptop market
A discussion of the up-and-coming laptop market answers the timely question — is the world now ready for laptops? Plus a look at new products and their capabilities.

Cutting-edge technologies
A sneak preview of the PC industry's cutting-edge technologies — artificial intelligence, expert systems, neural networks, image processing, and other "exotic" technologies.

Project management software
A thorough examination of what project management software is available for personal computers and how it's being used — plus a case history highlighting one organization's use.

The November 4 *Computerworld Focus* on Personal Computers — now's the time to put it to work for you. And, when you advertise in this special PC issue, our bonus distribution at Comdex/Fall delivers your message to thousands of show attendees at no extra charge.

For more information, contact Ed Marecki, Vice President/Sales, *Computerworld Focus*, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700. Or call your local *Computerworld* sales representative.

COMPUTERWORLD

FOCUS

SALES OFFICES: **BOSTON:** (617) 879-0700/**NEW YORK:** (201) 967-1350/**WASHINGTON, D.C.:** (703) 280-2027/**ATLANTA:** (404) 394-0758/
CHICAGO: (312) 827-4433/**DALLAS:** (214) 233-0882/**SAN FRANCISCO:** (415) 347-0555/**LOS ANGELES:** (714) 261-1230

COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

Speaking in tongues

Not long ago, this column focused on the top 10 industry cliches that are used (and definitely overused) by those who design, make and sell computer systems.

The time has come to look at acronyms, those shorthand expressions designed to abbreviate several words into one catchy term: MS-DOS, PC, CICS, ASCII, CCITT, IBM, MVS and so on.

The computer and scientific industries love acronyms — always have. In the past, acronyms served an important purpose for computer scientists and their like: saving time. A pleasant side effect was that acronyms gave technical people their own language, thus separating the scientists, programmers and engineers from the likes of everyday citizens.

As language history and American culture go, acronyms — and computer technology — are practically brand new. One of the first to be widely used was radar (radio detecting and ranging, dating to 1941), which became so widely accepted that it eventually evolved into an actual word itself.

American society began using acronyms not so much to save time but to prevent embarrassment. AA, for example, was much easier to say than Alcoholics Anonymous.

They're everywhere

But with everyday Americans becoming intimately involved with technology at home (TV, VCR, CD) and at work (MIS, PC, CIO), as well as the proliferation of special interest groups like Mothers Against Drunk Driving (MADD), acronyms are clearly getting out of hand.

Consider the following acronyms, culled from computer industry trade newspapers, the *Computer Acronyms, Abbreviations, Etc.* dictionary and various trade shows:

- AQUARIUS: A query and retrieval interactive utility system. See also "harmonic convergence."
- HAG: Home address gap. A

Continued on page 98

Hogan-IBM pact fails to deliver

Sixteen months after signing deal, firm has yet to see sustained growth

BY CLINTON WILDER
CW STAFF

DALLAS — In May 1986, IBM shocked the mainframe software industry when it announced an unprecedented, 20-year OEM agreement with bank applications developer Hogan Systems, Inc. Although the deal was widely criticized by Hogan competitors and ADAPSO officials because of IBM's vaunted marketing muscle, Hogan analysts hailed it as an instant success formula for the struggling company.

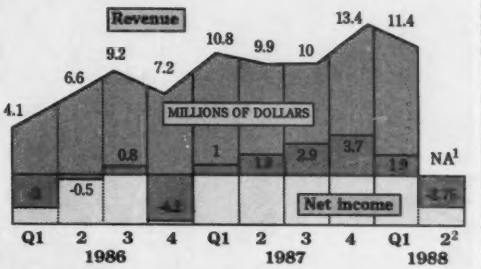
Sixteen months later, Hogan's growth prospects remain an enigma. IBM's exclusive North American sales rights to the Hogan product line have not borne the fruit originally expected, observers say. Hogan predicts it will report a loss of between $2.5 million and $3 million in the quarter ending this week, compared with a $1.9 million profit a year ago.

Although the loss is inflated by Hogan's decision to include several negative accounting items in this quarter's figures, the firm also says it will not meet its revenue expectations for software licenses and maintenance and customer service fees. The loss will deliver a blow to Hogan's recovery that began in the fiscal year ended March 31, in which the company increased revenue 63% and turned a $6.8 million loss into a $9.5 million profit.

Continued on page 99

Hogan's roller coaster

After five profitable quarters, the company projects a return to losses in current quarter



[1] Not available; company declined to project revenue
[2] Projected; fiscal year ends March 31

INFORMATION PROVIDED BY HOGAN SYSTEMS, INC.
CW CHART

On-Line acquires DB2 firm

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — Moving to increase its expertise in the IBM DB2 world, On-Line Software International, Inc. last week acquired X-Tended Computing, Inc., a Denver software consulting and development firm, for $450,000 in cash.

The acquisition should help On-Line broaden its involvement with the IBM relational data base management system by providing end-user training and product development capabilities, analysts said.

On-Line, which does not market a competing relational DBMS, is known for having expertise in CICS, for marketing productivity tools and for offering customer training. Just one month ago, On-Line increased its presence in the DB2 arena by unveiling Casepac, a computer-aided software engineering tool for developing applications to run against DB2 [CW, Aug. 24].

"With DB2 so important to IBM, it's becoming a strategic product for On-Line," said Alice Kessler, On-Line's senior vice-

Continued on page 100

Inside

- CDC relinquishes last stake in financial services unit. Page 96.
- Apollo to provide hardware platform for trader workstations. Page 99.
- MCI's McGowan back after heart transplant. Page 96.

Foreign exchange trader costs Apollo $5.7 million

BY ROSEMARY HAMILTON
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. plans to shave $5.7 million off its third-quarter profits because of losses incurred from an employee's unauthorized activity in the foreign exchange market.

With an internal investigation under way, officials provided few details on what caused this loss, which they said will cost shareholders 16 cents per share in the third quarter.

After the announcement last Monday, Apollo's stock fell 1¼ points to 19⅞.

Based on preliminary findings, company officials said they believe an employee, whom they would not identify, engaged in unauthorized foreign exchange contracts during the past year in an attempt to cover up an earlier error made in an authorized contract.

Officials declined to say if the employee's dealings were illegal, nor would they say if the employee had been fired. The employee was hired two years ago as Apollo's foreign exchange trader and worked at the company's headquarters.

It is common practice among companies doing business overseas to work the foreign ex-

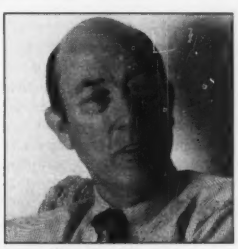
Continued on page 99

George Morrow looks to the future, examines the past

"For me, creating products is like a woman having children," exclaims George Morrow, the colorful former president of Morrow Designs, Inc., a 9-year-old microcomputer company that folded last year.

"I have an idea for a product — getting pregnant; I make something and bring it to market and get it out the door. [Similarly,] the child is born, and the child grows up. That's the way I view a product."

As a former maker of CP/M-based 8-bit micros, Morrow is considered an industry legend; he often makes the trade show rounds, speaking on both industry and technology issues. Despite some 25 product offspring, Morrow cannot stop producing.



George Morrow

He is back in the saddle as chief technologist at Nestar, Inc., a Mountain View, Calif., local-area network company. While at Nestar, he has developed Co-Star, an intelligent hard-disk controller that is purported to run 3.6 times faster than other products on the market.

From his home in Hillsborough, Calif., Morrow spoke with *Computerworld* West Coast Bureau Chief Kathy Chin Leong about the demise of Morrow Designs, his plans for the future and his view of the computer industry.

What happened at Morrow Designs?

We didn't keep up, borrowed money when we shouldn't have and didn't move over from eight to 16 bits successfully.

But didn't you have a 16-bit microcomputer?

Yes, we did, but not until the end. We should have had it a year before that. The machine we did have is still selling into the Internal Revenue Service through Zenith. After Morrow went bankrupt, Zenith got rights to the machine from the bank, and they

Continued on page 104

MCI welcomes back McGowan

Returns from lengthy absence after heart transplant

WASHINGTON, D.C. — MCI Communications Corp. Chairman William G. McGowan returned to an active role in the company last week after being in temporary retirement because of heart transplant surgery performed last April.

McGowan and MCI Vice-Chairman V. Orville Wright, who served as acting chief executive officer during McGowan's absence, will together make up the newly created chief executive office, MCI announced last week.

The two officers will share responsibility for MCI's strategic direction and policy development, an MCI spokeswoman said. McGowan and Wright "have worked together as a team for 12 years, so their sharing the office ensures stability and continuity" within the firm, she added. Wright was president and chief operating officer at MCI until October 1985, when Bert C. Roberts Jr. assumed the role.

CDC sells final stake in unit

MINNEAPOLIS — Marking another phase in its corporate restructuring and move toward recovery, Control Data Corp. last week announced the sale of its remaining 18.3% stake in its former financial services subsidiary, Commercial Credit Co.

CDC said it will receive $313.5 million from Commercial Credit and plans to reduce its debt-to-equity ratio with the proceeds.

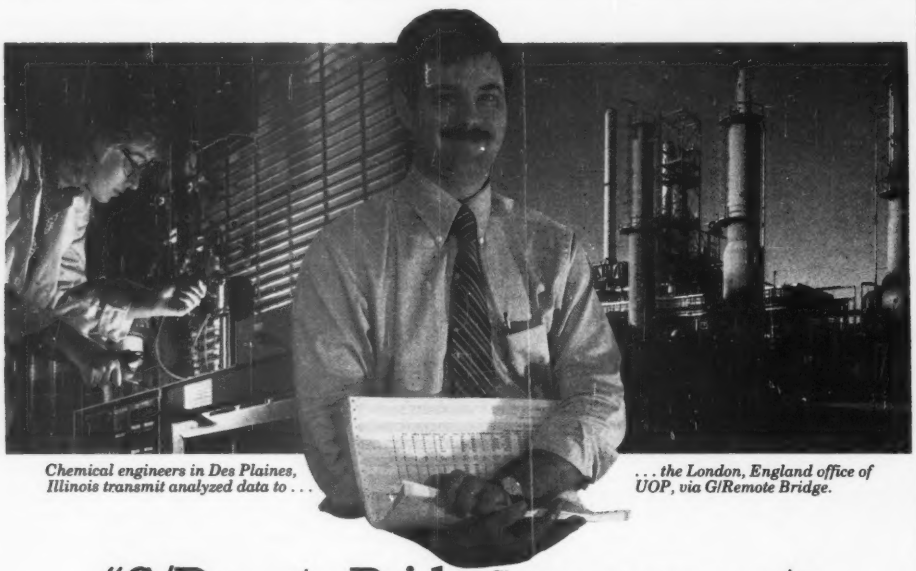
CDC has issued a substantial amount of debt as it weathered a severe fiscal crisis in the past two years.

Some of the gain from the sale, according to CDC, may be offset by costs associated with its recently announced replacement program for components in its FSD II disk drives. That progam will cost the company some $40 million, according to analysts.

Last year, CDC sold 70% of the subsidiary through a public offering and another 10% to former American Express Co. President Sanford I. Weill and his management team [CW, Sept. 22, 1986].

CDC acquired Commercial Credit in 1968.

The financial firm was one of CDC's few profitable operations when its computer and peripherals businesses sustained massive losses in 1985 and 1986.



Chemical engineers in Des Plaines, Illinois transmit analyzed data to . . .

. . . the London, England office of UOP, via G/Remote Bridge.

"G/Remote Bridge™ saves us up to four days delivering proposals by linking our NetWare® LANs."

Says Dennis O'Brien, project manager/marketing services for UOP Inc., a unit of Allied-Signal.

UOP develops refinery technology, sells catalysts, and provides services to refineries and petrochemical plants throughout the world. With the center of the company in Des Plaines, Illinois, communications to the home office is vital for remote offices and field engineers. Responses to sales proposals with technical analyses flow to these remote sites from Des Plaines.

Under Pressure For Quick Data.

"We used to have a problem exchanging data with the field offices. The number of steps we went through to provide accurate data was unacceptable; it seemed to take forever to communicate the data back and forth. Our specialists were always under a lot of pressure to get the information back quickly.

"With the help of Al Chaney, a Gateway VAR, we recently bridged our G/NET™ LAN in our London, England office to our G/NET LAN in the Des Plaines office with Gateway's G/Remote Bridge. This connection helped us to resolve our information sharing and processing problems, and saved us as much as four days per proposal.

"The G/Remote Bridge even provides us with the ability to connect any NetWare LAN to any other NetWare LAN. In fact, we could expand up to 32 LANS in a common worldwide network using X.25 synchronous links, which take care of all the routing and error-correction functions.

Transparent Data Access.

"The best thing about the G/Remote Bridge is once you set up the initial configuration, it is totally transparent to the user. We even run Gateway's G/SNAnet™ mainframe connection over the bridge for 3270/3770 access from our LAN to our IBM mainframe to further expand the information sharing.

"Our Houston office will be linked to the Des Plaines LAN later this year to gain access to marketing data and mainframe services."

For more information on how you can share information with products from Gateway Communications, just call

1-800-367-6555
(714) 553-1555 in California

Gateway communications, inc.
2941 Alton Ave. • Irvine, CA 92714

G/Remote Bridge, G/NET, and G/SNAnet are trademarks of Gateway Communications, Inc. NetWare is a registered trademark of Novell Inc. Copyright© 1987 Gateway Communications, Inc. All rights reserved.

Maxtor taps PCI to quench thirst for film heads

BY JAMES A. MARTIN
CW STAFF

MINNEAPOLIS — Peripheral Components International (PCI), the storage components marketing division of Control Data Corp., has agreed to supply Maxtor Corp. with the thin-film read/write heads that Maxtor had significant difficulty obtaining this summer.

The one-year, $35 million contract is expected to help Maxtor, the San Jose, Calif.-based hard disk drive maker, resume its growth plans and shipment schedules this fall for its 5¼-in. 380M-byte hard disk drive.

As a result of thin-film read/write head shortages from its single supplier, Read-Rite Corp. in Milpitas, Calif., Maxtor's expected revenue dipped during the summer quarter by about $15 million, according to Bob Teal, senior vice-president of marketing and product assurance.

Delays for vendors using drives

Maxtor's problems in shipping enough 380M-byte hard disks to meet consumers' demands have caused shipment delays among the workstation and office automation system vendors that build with the drive. Among those Maxtor customers affected are Apollo Computer, Inc., Digital Equipment Corp., Data General Corp., Unisys Corp. and Texas Instruments, Inc.

Read-Rite had problems obtaining materials from one of its own suppliers, forcing production to drop from 4,000 to 2,000 heads per day. Read-Rite recently laid off some 100 employees and is attempting to get back on its feet with new management.

Maxtor will retain its contract with Read-Rite as a supplier and is negotiating second-source deals with other suppliers as well, Teal said. However, analysts said they expect PCI will supply Maxtor with the bulk of its thin-film media needs for Maxtor's 380M- and 760M-byte hard disk drives.

Maxtor was left in an awkward position after its two thin-film component sources, Read-Rite and Cybernex, Inc., merged last year and later stumbled. At the time, there were few viable alternatives to Read-Rite for those components.

New Yorker pounces on conversion opportunity

BY ALAN ALPER
CW STAFF

NEW YORK — It may not be as sexy as slick spreadsheet software or as technologically demanding as designing relational data base management systems, but converting data from obsolete systems into current formats is quickly becoming an attractive business for budding computer industry entrepreneurs.

One young New York company, Data Conversion Laboratory, is gaining a reputation among the area's Fortune 1,000 users for translating old file structures on disk or tape into formats compatible with current word processing and data processing systems.

Data Conversion already counts AT&T, American Express Co., Coopers & Lybrand, Inc. and Chubb Corp. subsidiary Chubb & Son, Inc. among its clients.

Optical scanning

The 3-year-old company is also attempting to cash in on technological improvements and cost reductions made in optical scanning. Operating as a service bureau, the firm is digitizing printed documents for permanent storage on high-capacity optical media.

Observers say the data conversion business is flourishing for a variety of reasons:

- Rapid shifts in technology during the last decade have left many corporations with files stored on antiquated word processing and data processing storage formats. Some manufacturers no longer support their older equipment or have gone out of business, and there are few off-the-shelf conversion packages suited for many out-of-date systems.
- The new generation of microcomputers uses 3½-in. media, in contrast to the 5¼-in. diskettes used with older machines. Businesses that adopt newer technology also need a way to access old files. Rekeying data is too time-consuming, costly and prone to error. Automated data conversion costs are about 25% of that of manual rekeying and are more accurate and consistent.
- The long-awaited "paperless office" has been very slow to materialize, as 95% of most documents are still stored the old-fashioned way — on paper.

Mark Gross

Many organizations, particularly in the insurance industry and the government, have begun using write-once optical disks to store high volumes of vital information.

Data Conversion co-founder and President Mark Gross, a former management consultant at Arthur Young & Co. in New York, noticed these trends about three years ago after starting his own general-purpose DP and office automation consulting firm.

"Rather than just doing consulting, I thought it might be good to build the tools to do document conversion," he recalls.

Working out of the basement of his home, Gross assembled a technical staff to provide customized conversion solutions and began reselling off-the-shelf packages for less complex tasks. He has since moved his company to a small warehouse in the borough of Queens — within easy commuting distance of New York's great concentration of Fortune 1,000 firms.

The company's revenue has doubled annually, putting it on a $1 million track for this year.

Data Conversion uses standard pattern-recognition to resolve tough data-translation problems. In some cases, however, data must be coaxed out of older formats in order to be interpreted and translated into new forms.

For more difficult jobs, the firm calls on its "data buster" device to fake out the incorrigible system. Data is transferred to a hard disk drive that, to the system, looks like a printer. The data is then translated into usable form, Gross notes.

Data Conversion has won customers by providing fast and efficient services, according to a cross-section of its current users. Chubb & Son, an insurance underwriting firm in Warren, N.J., uses Data Conversion to reformat a variety of word processing files from Wang Laboratories, Inc. and other systems into Compugraphic Corp. typesetting files.

"They do quick turnaround," says Donald Stiles, Chubb's graphics supervisor. "It's something we don't have the resources to do here, and even if we did, it might not be cost-effective because of the work flow we have."

Book transfer

Garland Publishing, Inc. in New York uses Data Conversion to transfer books written on a variety of word processors into formats that its systems can read. Data Conversion also transfers some typed manuscripts into digital form.

"If we can send the manuscript to a printer and not have to have it retypeset, we can save a lot of money," says Marine Buja, director of computer resources at Garland.

Optical scanning and storage, Gross says, will be the key to the firm's continued growth. "CD-ROM and write-once optical technology makes more sense than storing documents on microfiche because it's much cheaper," Gross says. "Somebody has to get the information onto optical media, and we're poised to do it."

Seeing is Believing.

TAB

Only TAB allows you to build, maintain and execute your IDMS/R, ADS/O, ADSA and COBOL (Batch, DC and CICS) applications on PCs.

The Application Builder (TAB) offers these features:

- IDMS/R Release 10.0
- ADS/Online, OLM, ADS/A
- Integrated Data Dictionary
- Schema/Subschema Facilities
- Upload/Download
- Cobol, Batch, DC, CICS
- DML Query and Update
- SQL Query and Report Writer
- Multi-User and LAN
- Runs on IBM AT or compatible, 386 machines, PS/2, 640K

The best way to learn about TAB and how it can increase your productivity (by offloading mainframe development and/or distributing application's execution) is to attend a free, half-day seminar and technical demonstration. Call (914) 735-1444 to register.

October 13	New York City
14	Chicago
15	Boston
16	Atlanta
19	Philadelphia
20	Dallas
21	Washington, DC
26	Seattle
27	San Francisco
28	Los Angeles
29	Denver

Call (914) 735-1444

Online/Database Software, Inc.
One Blue Hill Plaza
Pearl River, NY 10965

The Application Builder is a registered trademark of Online Database Software, Inc.
IBM AT, PS/2 are registered trademarks of International Business Machines Corporation.
IDMS R, ADS Online, ADS/A are trademarks of Cullinet Software, Inc.

EXPANSIVE

The entire spectrum of computer systems technology...

Speaking

CONTINUED FROM PAGE 95

computer hag, like a system crash, is not a pretty sight.

• HAM: Hierarchical access method. Sometimes confused with CEO, especially at trade show keynote speeches.

• MAGIC: Machine-Aided Graphics for Illustration and Composition (per AT&T) or Media Analysis, Grouping, Inventory Control (per NCR Corp.). See also "solution."

• MOUTH: Modular output unit for talking to humans. This one is listed in the computer acronyms dictionary. Missing from the dictionary, however, was TEETH (tedious everyday electronic telecommunications holes), which some less advanced communications directors also refer to as "busy signals."

• MUD: Master user directory. Also stands for much uncertainty and doubt.

• SCSI: Small computer systems interface. Pronounced "scuzzy," which sounds suspiciously like — well, never mind.

• SODA: System optimization and design algorithm. If a SODA isn't enough, you can opt for TEA (Tychron Editor/Assembler) and pick up TACOS (tool for automatic conversion of operational software) to go.

• TOADS: Terminal-oriented administrative data system. See also NERDS.

• WORM: Write-once read-many. Refers to that limited optical-disk technology. A perfect complement to scuzzy.

• WYSIWYG: What you see is what you get. A brilliant marketing and public relations acronym with little basis in reality. Since when do you actually see what you'll ultimately get when it comes to computers?

Take one home to use

Engineers and scientists initially perpetuated acronyms, and computer and communications products vendors pass them on in abundance to MIS directors and end users. To instill confidence in their employers, the end users toss acronyms about with a knowing air and take them home to use in front of house guests, spouses, children and pets.

Acronyms are highly effective in describing a complex technology with a simple term. But with the advent of WYSIWYG and the increasingly constant use of FYI, ASAP and PDQ, often the value of the acronym is seriously compromised.

Clearly, a line needs to be drawn between effective and excessive acronym usage. There's nothing wrong with a data communications director who talks to his staff about TCP/IP, OSI, CCITT, SNA and the like. But when that director goes home and finds himself scolding his telephone-obsessed teen with "FYI, Cynthia, if you don't get off that node ASAP, I'll deep-six your cash flow," he's reached the point of no return.

And that, as they say, is the bottom line (TBL).

Martin is a *Computerworld* West Coast correspondent.

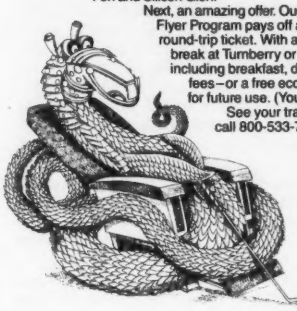
Pitch. And Putt.

Both are plusses of our inviting new Business Class Plus. We give you a first-class sleeper seat with a monster-size 60" "pitch" – the biggest there is (even "Nessie" can relax).

Naturally, we offer you the spacious comfort of a 747 with full meal and bar service. Also free limo pick-up within 40 miles of Newark this end and Birmingham or Stansted (for London) the other. (75 miles for Prestwick in our native Scotland.) And note: Highland Express is "the official airline" of Silicon Fen and Silicon Glen.

Next, an amazing offer. Our *IN*frequent Flyer Program pays off at once on a round-trip ticket. With a 2-night golf break at Turnberry or Gleneagles including breakfast, dinner, green fees – or a free economy ticket for future use. (Your choice.)

See your travel agent or call 800-533-7737.



HIGHLAND EXPRESS
The Scottish Flag Carrier

EXCLUSIVE

An international forum
for the 'computer elite'...

Stop software surprises. Start testing with TRAPS™.

Somehow, a little programming change can take on monstrous proportions if you're not careful. And an undetected error can make a program look like a different animal altogether.

That's why we've developed TRAPS (Testing/Recording and Playback System) to detect unwanted surprises in your software *before* they cause trouble for your users.

With TRAPS, you can build and maintain test cases in multiple on-line environments—from **CICS** and **TSO** to **IMS** and **DB2**. TRAPS captures keystrokes and screens and provides consistent, repeatable playback of test scripts. And since TRAPS runs on a personal computer, you conserve host resources and bypass the installation and scheduling roadblocks of mainframe testing tools.

When you test with TRAPS, you get a high-quality product the first time around. And you won't leave users in the dark with unexpected suprises.

For more information on TRAPS or our other innovative software products, contact TRAVTECH at **(203) 277-9595.**

TRAVTECH Inc.
One of The Travelers Companies
One Tower Square
Hartford, Connecticut 06183

TRAPS™ is a trademark of The Travelers Companies.

See us at INFO '87, booth #114

Foreign

FROM PAGE 95

change market in order to protect themselves from fluctuating currency rates. The practice is known as hedging.

A foreign exchange trader, working with information on sales and payments in various countries, will negotiate with financial institutions and execute contracts that transfer this risk of fluctuating currency rates to the financial institution.

There are a number of phases in the hedging process. In its most simple terms, the vendor negotiates with the financial institution to lock in an exchange rate when order shipments are recorded on the vendor's books.

Apollo's foreign exchange trader was apparently engaged in some hedging activity without keeping a record of it, officials said. "It was done very cleverly to circumvent our system of checks and balances," said John Newton, vice-president and treasurer of Apollo.

Nearly half of Apollo's revenue is generated overseas. The company said the employee in question has been suspended from conducting business on the foreign exchange market under Apollo's name.

Apollo, Programit team up; financial services targeted

BY ALAN ALPER
CW STAFF

NEW YORK — As part of a continuing effort to penetrate the financial services market, Apollo Computer, Inc. last week announced an OEM agreement with a leading consulting firm here that will use Apollo's Domain workstation as the hardware platform for its financial trader workstation.

The open-ended agreement with Programit calls for Apollo to supply its workstations during the next 18 months. Financial terms were not disclosed.

The agreement with Programit is part of Apollo's recent effort to expand its presence in the financial services market through strategic alliances [CW, Aug. 24]. During the last few months, Apollo has signed agreements with Prophecy Development Corp., Palladian Software, Inc. and Inference Corp.

"The agreement with Programit will improve our time to market with our products," noted William Kelly, Apollo's director of market development.

Apollo's Unix-based workstations are an attractive hardware platform because of their built-in multitasking and networking capabilities and IBM Personal Computer AT compatibility, provided via a coprocessor, noted Marshall Caro, Programit's chief executive officer.

Programit has developed software to download live market data from feeds such as Quotron Systems, Inc. and Reuters, Ltd. into PC-based applications for analysis. Programit's system lets data from up to four feeds be displayed simultaneously on an IBM plasma display or high-resolution Apollo monitor.

In a related announcement, Programit said it has signed a joint marketing agreement with Quotron to market the Domain-based system to the Los Angeles financial information services firm's customers.

George Levine, Quotron's marketing vice-president, said the Domain-based system will be one of the display options it offers with its Model 1000 financial information system.

Hogan-IBM

FROM PAGE 95

"After the IBM deal, there was strong, pent-up demand when customers saw that Hogan wasn't going under," says M. Arthur Gillis, president of Computer-Based Solutions, Inc., a banking MIS consultancy in New Orleans. "Now, they're faced with selling to the new guys."

Changes resulting from the IBM relationship have not been apparent to Hogan users, according to Fred Cisewski, MIS director of Bank South NA, a $3.7 billion bank in Atlanta. A Hogan customer since 1984, Bank South runs Hogan's deposits and customer information system packages.

'The black cloud'

"The biggest thing about the IBM agreement was removing the black cloud from the company," Cisewski says. "But we haven't seen much change on the service end. When you call, the person may know the applications code but not how it interfaces with the operating system. We would think they would get some help from IBM on that."

In the current quarter, Hogan reportedly will account for several one-time expense items, including increased allowances for doubtful accounts receivable and customer claims. E. F. Hutton & Co. software analyst Terence Quinn estimates the latter two charges at $1 million each.

The allowances relate to past products with which customers had problems and at which they balked at paying full license fees. Jim Dunn, Hogan's vice-president of finance and controller, confirmed that part of the allowances are for customers of the international banking software originally developed by New York-based Henco Research, Inc., acquired by Hogan in 1983.

But observers say the sales challenges facing Hogan are not limited to the current quarter. "If they were selling at a rapid clip, they would be able to cover those expenses," Gillis says. While no one is writing off the company, it is clear that IBM's sales force has not been the panacea for Hogan in the highly specialized world of large-bank software. Hogan users are generally loyal, but IBM has yet to show it can significantly expand Hogan's customer base.

"IBM has not been in as many bid situations (for Hogan) as one would have thought, notes analyst Jim Poyner of Dallas-based investment firm Rauscher Pierce Refsnes, Inc.

microDCF ...The Modern Way !

Speed and Convenience for SCRIPT and GML users

IBM made SCRIPT and GML into the DCF document composition standard in mainframe installations everywhere. With ALSI's microDCF you can now supercharge your PC workstations to get even greater power and flexibility.

Mainframe Compatible Source Text and Macros

If you have become accustomed to utilizing the powerful capabilities of Mainframe Script and GML such as mixing many fonts on a line, interspersing text with raster graphics, producing several columns side by side and automatically producing cross references and indexes within the largest documents then you will be interested in microDCF. You can conveniently use all of these functions and many more on your IBM or compatible PC/AT, PC/XT or PS/2.

Laser Printers and Impact Printers

microDCF lets you chose one of several popular desktop laser printers such as the IBM 3812 page printer, the Hewlett-Packard LaserJet Plus or the Xerox 4045 as well as popular impact printers such as Epson and the IBM ProPrinter. Before committing anything to paper you can preview all or part of your formatted document on your display screen.

ARRIX LOGIC SYSTEMS INC.

For More Information Call ALSI at: (416) 292-6425

ALSI

IBM and PS/2 are a registered trademarks of International Business Machines Corp. ALSI and microDCF are registered trademarks of Arrix Logic Systems Inc.

EXCELLENCE

A bold step...
a ground-breaking event...

NICKELS & DIMES

Duquesne Systems, Inc. announced revenue for the third quarter ended June 30 of $9.1 million, compared with $7.4 million last year. Profits were $1.9 million, or 17 cents per share, compared with $1.5 million, or 15 cents per share, in the like period a year ago.

Chips and Technologies, Inc. announced revenue for the fourth quarter ended June 30 of $27.6 million and net income of $4 million, or 30 cents per share. This compares with revenue of $7.1 million and net income of $1.4 million, or 10 cents per share, reported in the year-earlier quarter.

For the year, revenue was $80.2 million, compared with $12.7 million in the previous year. Profits were $12.9 million, or $1.01 per share, compared with $1.5 million, or 10 cents per share, in the comparable period a year ago.

Genicom Corp. reported revenue for the second quarter ended June 28 of $81.6 million, compared with $38.9 million a year earlier. Profits were $2.7 million, or 24 cents per share, compared with $2 million, or 22 cents per share, in the previous year.

Iomega Corp. announced revenue of $21.5 million and a net loss of $19.4 million, or $1.28 per share, for the second quarter ended June 28. This compares with revenue of $29 million and net income of $116,000, or 1 cent per share, in the like period a year ago.

Boole & Babbage, Inc. announced revenue for the third quarter ended June 30 of $10.3 million, compared with $8.7 million one year ago. Profits were $532,000, or 16 cents per share, compared with $244,000, or 7 cents per share, in the previous year.

EMC Corp. reported revenue for the second quarter ended June 30 of $28.8 million, an increase of 78% over the $16.2 million reported in the comparable quarter last year. Profits were $6.8 million, or 43 cents per share, compared with $5 million, or 32 cents per share, in the like period a year ago.

Aldus Corp. announced revenue for the second quarter ended July 3 of $9.3 million, compared with revenue of $2.4 million a year ago. Profits were $1.9 million, or 17 cents per share, compared with $668,000, or 6 cents per share, in the like period one year ago.

Interleaf, Inc. reported revenue for the second quarter ended June 30 of $10.5 million, compared with $6.4 million in the previous year. Net income was $723,000, or 6 cents per share, compared with a net loss of $1.2 million, or 13 cents per share, in the comparable period a year ago.

Gateway Communications, Inc. announced revenue for the second quarter ended June 30 of $3.4 million, compared with $2.7 million in the like period in 1986. Net profits were $203,248, or 4 cents per share, down from $321,575, or 7 cents per share, reported in the second quarter of 1986.

Paradyne Corp. announced revenue for its second quarter ended June 30 of $58 million, down from $67.1 million in the like quarter of 1986. Its net loss was $1.5 million, or 7 cents per share, vs. a loss of $1.9 million, or 8 cents per share, reported in the like quarter last year.

On-Line

FROM PAGE 95

president of marketing. "As many CICS experts as we have in the company today, we expect in the future to have DB2 experts."

Peter Burris, a software analyst with International Data Corp. in Framingham, Mass., said On-Line's acquisition of X-Tended demonstrates the firm's recognition of the large sums end users must spend in consulting and training after DB2 is installed.

"A company spends a couple of hundred thousand dollars on a data base and applications to put on it. They will spend 10 or 15 times that on getting that data base up to speed," Burris said.

X marks the tools

In addition to consulting and training, X-Tended markets a line of programmer productivity products, called X-Tools. On-Line intends to continue marketing X-Tools, Kessler said. The company has not decided whether to meld the products into Casepac or keep them independent, she added.

Shaku Atre, a DB2 consultant in Rye, N.Y., said she believes X-Tended will provide On-Line with DB2 software development capabilities that it did not have before. On-Line holds North American marketing rights for Casepac, which was developed by Tata Consultancy Services in Bombay, India.

"I think the acquisition will get them into developing more tools for DB2," Atre said. "They may be interested in the training aspect of the company, but I think software development was what they were after."

X-Tended was formed by five former IBM employees shortly after DB2's introduction in January 1984. The company was expected to generate $450,000 in revenue this year, Kessler said.

On-Line reportedly intends to keep X-Tended's personnel in Denver and operate the company as a regional office. All of X-Tended's employees have been given three-year minimum employment contracts, according to Kessler.

Separately, On-Line last week announced that profits in its first quarter, ended Aug. 31, rose 39% from year-earlier levels to $1 million, or 15 cents per share. Revenue nearly doubled from $9.7 million a year ago to $18.5 million. These results marked On-Line's 11th consecutive quarter of year-to-year sales and earnings gains.

EXCITING

A dynamic opportunity;
a breath-taking city...

"ProEdit Generates DB2 Test Tables 40% Faster."

Testing deadlines are hectic enough! You really can't afford to waste hour after hour creating and editing test tables. You don't have to with **DB/ProEdit!**™

- **Use ISPF Commands**

DB/ProEdit lets you edit DB2 tables using simple ISPF commands you already know. It's so easy current **DB/ProEdit users are saving 10-15 hours a week!**

- **Full-Featured Editor**

DB/ProEdit offers many more time-saving features including the ability to:

- **Test embedded SQL**
- **Edit in table or row format**
- **Duplicate existing table definitions**
- **Query selective rows and columns**
- **Easily create tables and indexes**

- **Free 30-day Trial**

See how **DB/ProEdit** makes hectic deadlines just a bad dream from the past. Call Updata Software to receive your **FREE** trial.

Updata™ SOFTWARE (201) 946-2000
960 Holmdel Road
Holmdel, NJ 07733

On March 28, 1988, MIS/DP executives from around the world will encounter a new kind of event. A global congress of ideas, strategies and solutions addressing the issues facing computer applications professionals from all major organizations.

The World Congress on Computing. A massive exposition of computer systems hardware, software, services and accessories. An applications-driven conference, designed and presented by business leaders and technology innovators. A highly-focused meeting ground for senior executives who manage the world's information power.

THE WORLD CONGRESS ON COMPUTING

THE WORLD'S MOST IMPORTANT COMPUTER SHOW

EXCEPTIONAL

Join the exceptional people and companies who will participate in this landmark event. Complete and return the coupon today for information. To reserve your company's exhibit position, call (617) 449-660, Ext. 4013.

TELL ME MORE

about the exceptional opportunities coming in The World Congress on Computing!

☐ Send me complete exhibitor information
☐ Send me complete attendee information

WCC℠
THE WORLD CONGRESS ON COMPUTING

March 28–31, 1988
McCormick Place
Chicago, Illinois
USA

Name _____

Title _____

Company _____

Address _____

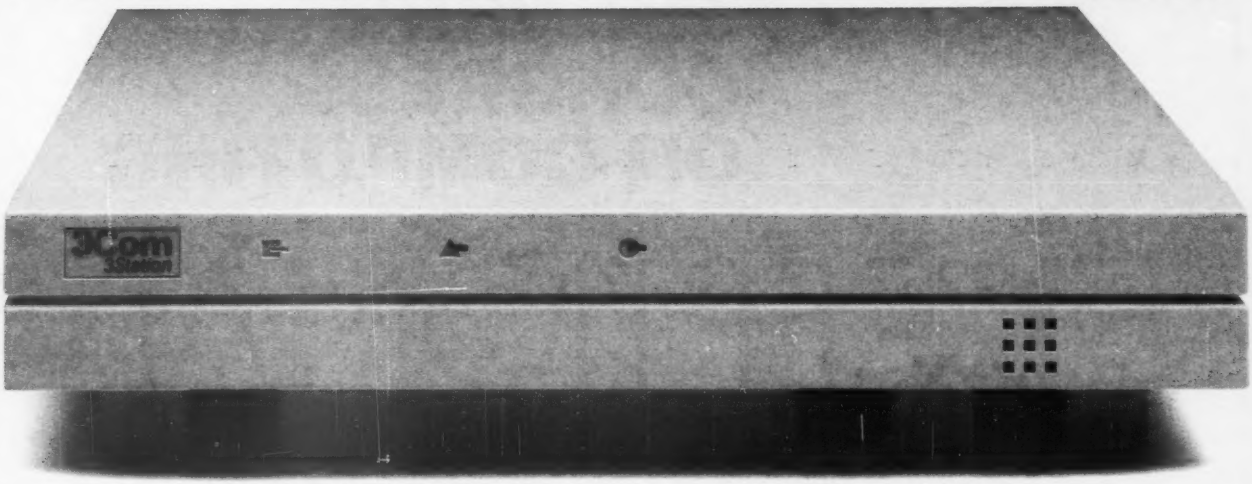
City _____ State ____ Zip _____

Phone (_____) _____

Return to: The World Congress On Computing, 300 First Avenue, Needham, MA 02194.

Produced by
THE INTERFACE GROUP, Inc.
World's Leading Independent Producer of Conferences and Expositions.

3STATION. THE NETSTATION DESIGNED TO IMPROVE THE PERFECT NETWORK.



3Station's tiny footprint (14" x 14" x 3") means more space and less clutter on a user's desk.

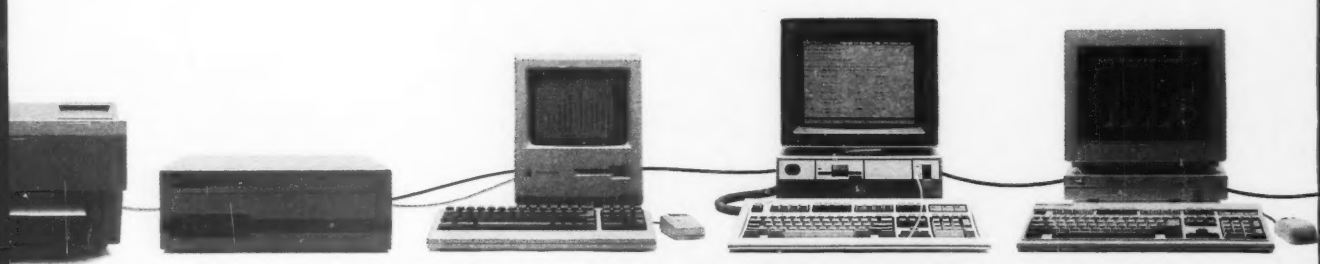
Two years ago 3Com introduced the first network optimized server.

Today 3Com introduces the first network optimized workstation.

With 3Station we've significantly increased the performance and productivity of 3System by putting technology to work for you.

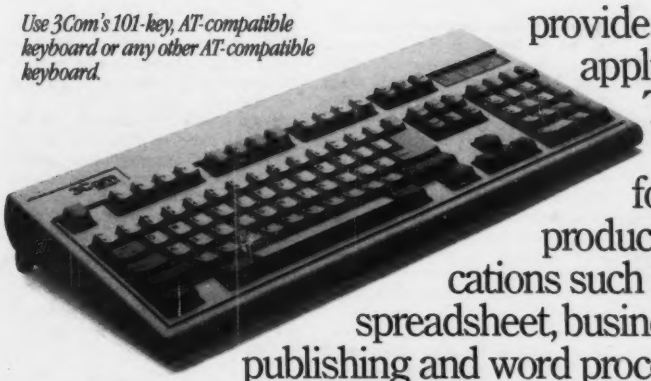
3Station is easy to use and offers better performance and reliability than using adapted PCs on your network.

And its high performance 80286 microprocessor and 1Mb main memory



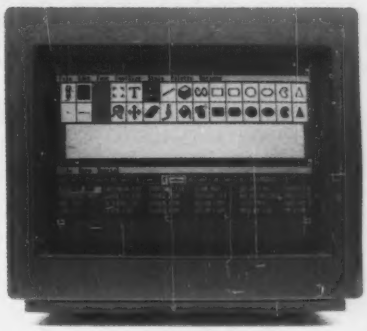
© 3Com Corporation 1987. 3Com and 3Server are registered trademarks and 3Station and 3System are trademarks of 3Com Corporation;

Use 3Com's 101-key, AT-compatible keyboard or any other AT-compatible keyboard.



provide up to 35% more memory for your applications than adapted PCs. This makes 3Station the optimized workstation for business productivity applications such as database, spreadsheet, business graphics, publishing and word processing.

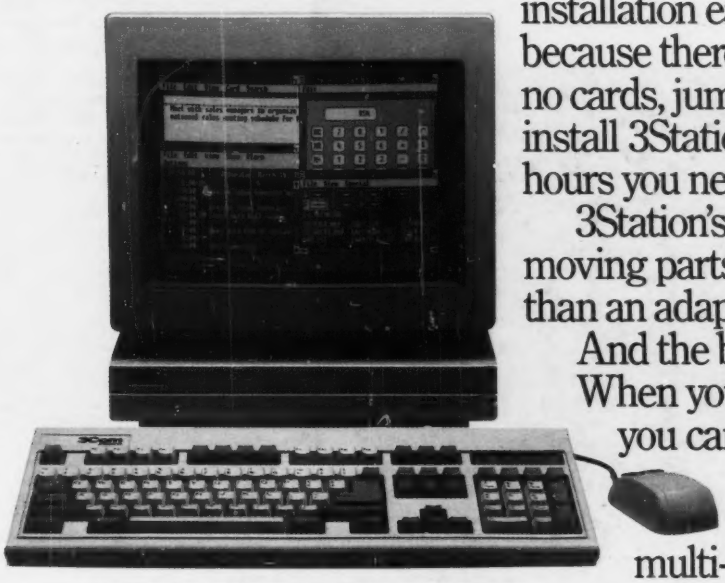
3Station's built-in EGA graphics, Ethernet adapter, I/O and memory increase performance and make installation easy because there are no cards, jumpers or switches. You can install 3Station in minutes rather than the hours you need to adapt a PC.



You can use EGA, CGA or monochrome (including Hercules), monitors with 3Station.

3Station's single board design with no moving parts also provides more reliability than an adapted PC.

And the best news of all? When you use 3Station in a 3System, you can realize significant cost savings, up to 50% per user, compared to adapted PCs or multi-user micros and minicomputers.



3Station is ideal for memory-intensive applications.

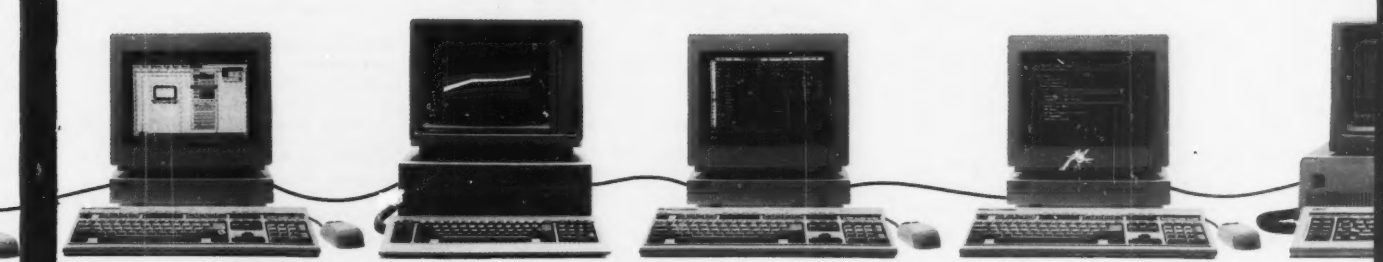
So with 3Station's price and performance, why use adapted PCs on your network?

When the future is 3Station.

For your nearest 3System dealer, or more information, call 1-800-NET-3Com.

PC MAGAZINE EDITORS' CHOICE

3Com®
WORKGROUP SYSTEMS



Hercules is a registered trademark of Hercules Corporation. IBM PC/AT is a registered trademark of International Business Machines Corporation.

Morrow

CONTINUED FROM PAGE 104

did wind up with an exclusive license.

It must have been hard to file for Chapter 11 protection. Did you see it coming?

No one ever promised me a rose garden. I think that I have to blame myself more than anyone else for it. I did see it coming. We were positioning ourselves to go to the public market. Our offering was to be made the day after Osborne Computer went bankrupt.

Instead of working on the transition from eight to 16 bits, we devoted all our energies to going public.

How did you get into the micro business in the first place?

I was going to be a research mathematician, but I didn't like the politics in universities. I invested seven years in putting myself through a Ph.D. Then I looked around and thought, "What can I do with my background?"

Computers were a natural. The micro had just arrived, and I kind of stumbled into it. I started the company and went from product to product. That's not a business. It's just an opportunity. We moved up to $12 million, and it was at $25 million that I realized that you can't run a business going from product to product.

Then why didn't you hire someone to provide that anchor, that grand design, for your business?

We did. We brought in Norm Townsend, who provided a better way of defining products, and he got us up to $10 million in sales when we were at $3 million. Then I ran into Bob Dilworth, who went on to Zenith. Dilworth was brought on to help position us.

But you need more than a plan. You have to monitor the plan and constantly question the appropriateness of that plan. It wasn't easy for those of us in the 8-bit world to move to 16 bits. And we shouldn't have gotten so deeply mired in a product line that wouldn't have market acceptance.

Why was it so hard to move to 16 bits? Was it technically difficult?

No, not at all. It was an emotional issue. The original group [of entrepreneurs] was used to bringing better bang for the buck. We wanted to do something better than the other guy.

But that wasn't feasible with IBM, because if you didn't copy them exactly, you didn't survive. Then why make a product with no real performance or price advantage? Compaq was able to be very "me-too," but they had a portable. They took Osborne's idea and made it an MS-DOS machine. I later took that same idea and made mine battery-powered.

For people who were used to figuring out how to do things better, it was hard psychologically. We should have just copied IBM exactly.

After the company folded, why didn't you start another or go to another PC company? What led you to Nestar?

After the company went kaput — in February 1986 — I started a small company called Intelligent Systems with Darrell Ticehurst in May to make a high-performance disk controller.

We were looking for financing. Nestar saw that what could make a disk controller run faster would make a file server run faster. I ended up riding one horse to death. . . . I wasn't about to ride another one to death, even though what I had was just a colt.

What is your role at Nestar?

I am here to make sure this technology is transferred into their products. I have product responsibility as part of the sale. I'm the chief scientist.

Describe those first products.

They are intelligent disk-manager products. One is a product that hooks into the SCSI bus, another hooks into a LAN, the third hooks up to a Seagate SD506.

How long do you intend to stay at Nestar?

Probably until the first part of next year. Until the products are all out the door.

What other projects do you have going?

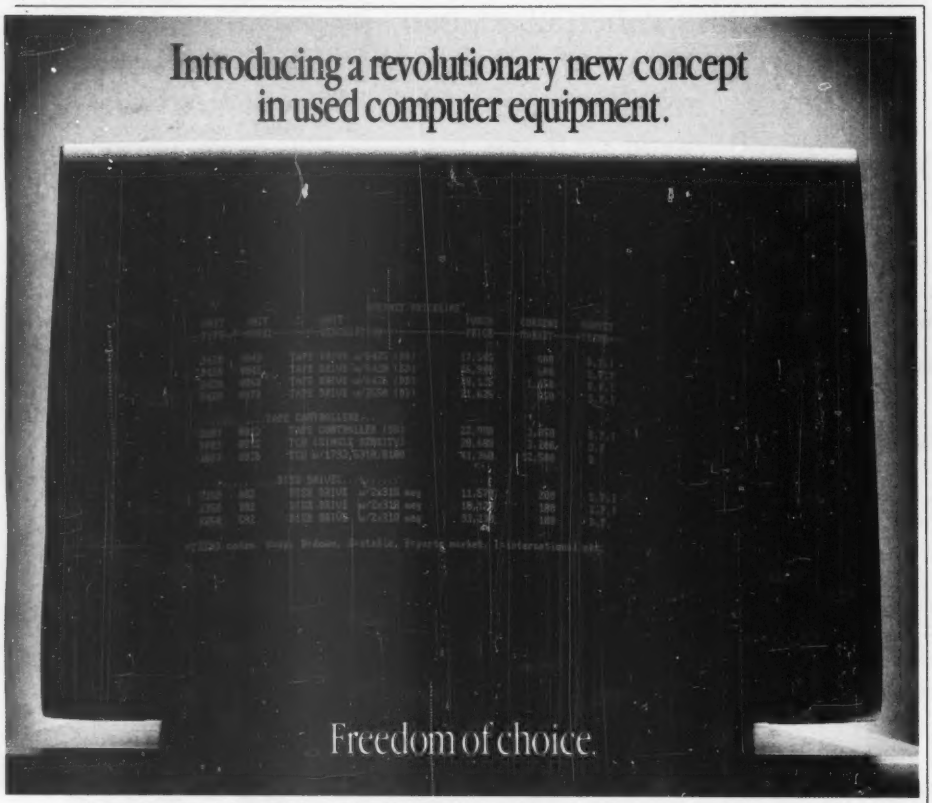
Consulting, writing, some product work. I'm acting as an expert witness. You see, there are a lot of lawsuits going on. People are suing, and they are technical in nature. Lawyers and judges have to hire expert witnesses — people who speak English and understand the technical.

What is your impression of the PC industry right now?

We are going through another transition with the PS/2 similiar to the time when IBM first introduced the PC. There will be healthy companies and those that cannot make the transition.

What area would you want to get into again?

I just love to develop products. Any product. I like to see fast cycles. I interviewed this guy at Stanford, and he worked on a superconductor for 23 years. I don't have that patience. I want to see things start and finish and get all the satisfaction out of it. I concentrate on taking things that exist and figuring out how the technology can be applied. If an emerging technology is going to be mainstream, I want to get on that train just as it's pulling out of the station. I want to use technologies in ways they haven't been used before.



Introducing USERNET,™ the first online network for users to buy and sell used mainframe equipment—among themselves.

Now DP professionals and corporate managers are no longer at the mercy of dealers and resellers when it comes to buying or selling used computing equipment. With USERNET, an easy-to-use, dial-up network, they can trade among themselves—without the hype and high markups offered by many dealers.

USERNET's members choose from a large selection of computers and peripherals. And with the help of the built-in wholesale price list and market price trend indicator they negotiate a fair price—for both buyer and seller. Members can save thousands of dollars because the only costs are for network access and a small transaction fee.

USERNET's professional staff continues to provide support after the sale, including managing transportation arrangements and providing maintenance qualification letters, feature changes and even installation, de-installation or storage services.

Sound like a good deal? It is! And USERNET offers many other professional services, including technical consulting and disaster recovery. Call today to find out more about USERNET's complete services and to qualify for the initial membership offer—or fill out the attached coupon.

USERNET

Toll Free: *1-800-235-6090*/In Georgia call: *404-980-5103*

USERNET, Inc.
5780 Powers Ferry Rd., Atlanta, GA 30327

☐ Please send me a USERNET membership kit.
☐ Please send me more information about USERNET.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone (_____) _____

For those analyzing developments in the PC industry, Compaq offers an executive summary.

Compaq still

In the midst of the clamor surrounding the new IBM® PS/2 series of personal computers, one thing is perfectly clear to people who really know PC's. COMPAQ® personal computers still work better. They're faster, more compatible, more expandable, and more flexible to accommodate the advancements so many users demand.

Consider flexibility. Compaq offers 5¼" diskette drives, and allows you to add 3½" drives if you want them. In fact, you can add up to four different storage devices on all COMPAQ desktop computers.

Demand for the 12-MHz COMPAQ DESKPRO 286 has nearly doubled since the PS/2 introduction.

The 12-MHz COMPAQ PORTABLE III is the smallest, most powerful full-function portable there is.

And what users demand are advancements that enhance their productivity *within* the industry standard.

Advancements that extract more performance from over 10,000 different business software programs—the largest library of productivity software in the world.

Still the performance leader

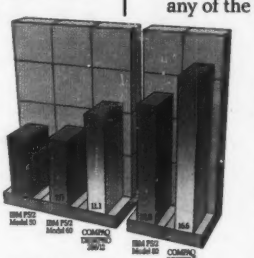
COMPAQ personal computers prove superior in overall performance.

Take speed. The COMPAQ DESKPRO 286® runs your software up to 20% faster than its PS/2™ counterpart. It also has high-performance fixed disk drives that are up to 2½ times faster than theirs, with access times averaging less than 30 milliseconds. What's more, the COMPAQ DESKPRO 386™ sets all the records for speed in advanced-technology, industry-standard personal computers.

Examine compatibility. We let you use all the industry-standard software and expansion boards that you already own.

Look at expandability. Because our slots follow the industry standard, you have almost unlimited options to add the functions you need. Extra memory, networking, communications, and many others. So you can configure your system exactly the way you want it.

Finally, compare portability. You can't. The 12-MHz 80286-based COMPAQ PORTABLE III™ is the undisputed leader. It offers all the functions and performance you'd expect to find in the most advanced desktops. Without any of the compromises you'll find in other portables.



COMPAQ PC's outperform PS/2 PC's in tests for processor speed & disk performance, using the Norton Performance Index Version 4.0.*

Enhancing, not inhibiting

Each component in every computer we build is designed to be the best, both individually and as part of the overall system. This way enhancements work together to give you unparalleled performance. Faster RAM. Internal backup systems. Expanded memory and disk caching systems. Faster processors and coprocessors. Faster fixed disk

It still simply works better.

*Index based on a scale that rates the original IBM PC as 1.00.

IBM, OS/2 and PS/2 are trademarks of International Business Machines Corporation. Lotus, 1-2-3, and Symphony are trademarks of Lotus Development Corporation. Microsoft is a trademark of Microsoft Corporation. Paradox is a trademark of Ansa Software. dBASE III PLUS is a trademark of Ashton-Tate. MS OS/2 is a product of Microsoft Corporation.

©1987 Compaq Computer Corporation. All rights reserved.

works better.

The COMPAQ DESKPRO 386 sets the standard for high-performance, advanced-technology desktop computing.

40 million software packages, 32 million peripheral products, and hundreds of millions of hours in training. Compaq designs its computers to protect your investment. And because they do more, they also maximize it.

drives that store more. These are all innovations built into both desktop and full-function portable PC's.

Innovations made *without* sacrificing industry-standard compatibility.

Earn higher returns on your investment

The industry standard has a lot going for it. Namely, you and over 10 million other PC users it represents. American business has $80 billion invested in the current PC standard, including

Two-way compatibility

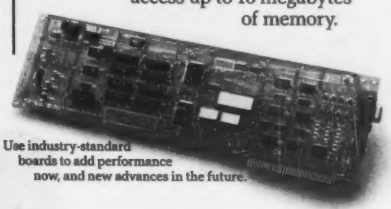
Compaq has become famous for its legendary compatibility and connectivity. Our PC's will run thousands of programs far faster

The new MS OS/2 operating system will run on all 80286- and 80386-based COMPAQ personal computers.

than other computers. All the popular programs, including Lotus® 1-2-3®, dBASE III PLUS®, Microsoft® Word, Symphony®, and Paradox®, to name just a few. Without modification.

Furthermore, you can insert the 5¼" diskettes your COMPAQ computers use into all the other compatible computers in your office, without time-consuming diskette conversions.

But our definition of compatibility looks to the future as well. For example, all 80286- and 80386-powered COMPAQ personal computers will run the new MS OS/2 operating system, allowing you to break the 640-Kbyte memory barrier and directly access up to 16 megabytes of memory.



Use industry-standard boards to add performance now, and new advances in the future.

COMPAQ computers will also allow you to run all the applications developed for OS/2™ Again, much faster.

We don't burn bridges, we build them

At Compaq, advances are measured by our ability to push technology forward, without leaving you behind. Building onto an existing body of work is more valuable than starting from scratch. That thinking led Compaq to the Fortune 500 faster than any other company in history.

The PC industry standard has the flexibility to incorporate developing technology. More important, however, Compaq lets you take advantage of the latest technology in a way that's fully compatible with the hardware, software and add-ons you already own. So Compaq protects your investment, building bridges from today to tomorrow.

These are all reasons why recent surveys show COMPAQ owners are the most satisfied personal computer users.

All the more reason to call 1-800-231-0900, operator 39 for information and the location of your nearest Authorized COMPAQ Computer Dealer. In Canada, call 416-449-8741.

COMPAQ®

NonStop CLX.™

Low-cost, distributed processing for every business location.

ONE SYSTEM, FOUR SIZES.

The newest member of the Tandem NonStop family can run a fully distributed network. You can start with a single-processor system ideal for small applications. You can expand to two, four and six-processor systems, with over 10 gigabytes of memory, enough for hundreds of users at each node in your network.

ADVANCED COMPONENTS, FEWER PARTS.

Our custom CMOS chip design delivers more performance on less power and requires less space.

So does everything else. Our single-processor system operates with only two boards. The processor board consolidates over 1,000 integrated circuits in a six-chip set and comes with four megabytes of memory. A single integrated controller board supports disk, tape, communications and remote maintenance.

EASY MAINTENANCE, REMOTE DIAGNOSTICS.

Special software does all the work, so you can maintain it yourself, let us do it, or we can do it cooperatively.

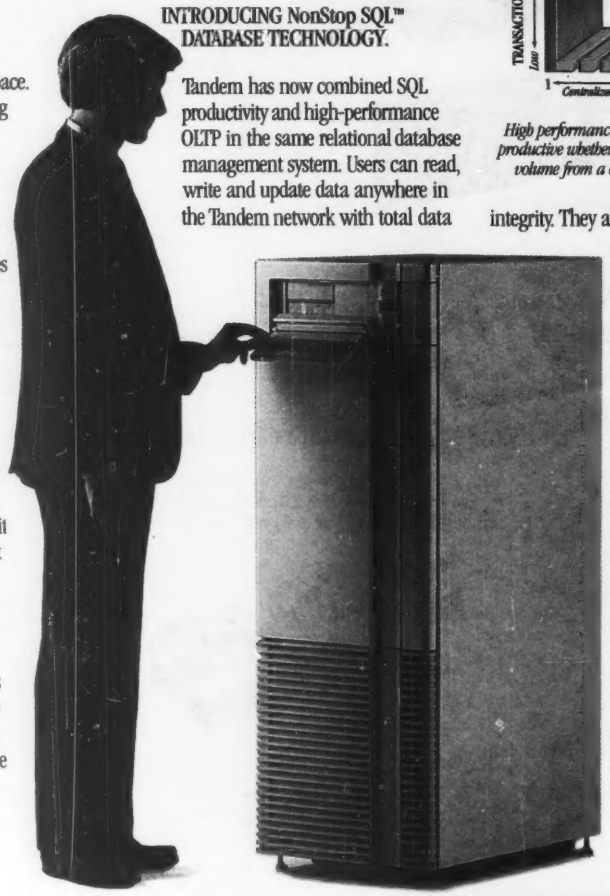
All critical components can be replaced without tools by any office worker. They can be easily replaced without interrupting the application. That means fewer service calls that take less time. Other software allows remote diagnostics from Tandem service centers.

ONE SOFTWARE FITS ALL.

Tandem's unique, parallel architecture turns all systems into one system. This top-to-bottom compatibility means you can change the size of the system without changing the application software.

INTRODUCING NonStop SQL™ DATABASE TECHNOLOGY.

Tandem has now combined SQL productivity and high-performance OLTP in the same relational database management system. Users can read, write and update data anywhere in the Tandem network with total data integrity. They also have local database autonomy so that local processing continues when other parts of the database in the network are unavailable.



High performance at any level. Only Tandem is equally productive whether you're processing transactions in high volume from a central site or many distributed sites.

EXTEND YOUR TANDEM NETWORK. OR START ONE.

Now it's easily affordable. Whenever there's a need for constantly current information, efficient expandability and unbeatable price performance, Tandem technology proves consistently superior. Compare us to any other OLTP system. You'll see why companies in every major industry choose Tandem.

For information, write: Tandem Computers Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014. Or call 800-482-6336.

TANDEMCOMPUTERS
The technology leader in on-line transaction processing.

"...Computerworld has proved to be one of the most effective media for reaching our high-tech target groups."

— Michael Gill
Senior Vice President/
Creative Director
Thompson Recruitment Advertising

Michael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising, based in Los Angeles, California. In 1986, Thompson won more EMA awards than its three largest national competitors— combined. The company's advertising goal is a simple but demandiing one: To create the most effective recruitment advertising in the marketplace.

Thompson can point to many reasons for its success. And one of the first that comes to mind, Michael says, is Computerworld and its Employment Today section.

"Today's job market continues to change rapidly. It's no longer enough to merely post a job and hope that people will come running. This new competitive marketplace demands that we use many new approaches and do a lot more research. Simple demographics just aren't enough any more. Fortunately, Computerworld understands this need for research that goes beyond numbers alone.

"For us, Computerworld has proved to be one of the most effective media for reaching our high-tech target groups. We've discovered that it is must-reading for many of the high achievers that our clients want to attract.

"In fact, we recommend Computerworld to our clients because we know that it will reach prospects most effectively. Among other benefits is the quality of the publication itself, which reinforces the quality of our campaigns.

"The successful recruiter knows that today's marketplace is highly competitive, and that tomorrow's marketplace will be even more so. At Thompson, we expect that tomorrow, as today, Computerworld will be an invaluable ally in helping us to achieve our mission of creating the most effective recruitment advertising in the marketplace."

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Michael.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350

WASHINGTON, D.C.: 3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042, (703) 876-5100

CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 261-1230

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (415) 322-33314

An IDG Communications Publication

Planning your way to the top

Today's career paths require a structured approach if they are to succeed

BY DALE F. FARMER
SPECIAL TO CW

In the days before data processing was elevated to a vital tool of corporate strategy, career path planning for computer professionals was easy — you could remain a programmer for one company for years and years, or you could bounce from job to job every two years, seeking higher positions each time.

Today, however, MIS is a more structured profession. Many new jobs are being created within the discipline — from chief information officer to knowledge engineer — offering a wider variety of growth opportunities for professionals.

The careers of MIS professionals require more careful planning than those of other employees because of the rapid pace of technology. As computers continue to expand in speed and capacity, job opportunities will continue to grow.

Many still easygoing

Despite the changes, many professionals still cling to the traditional, casual approach to career planning. In a recent *Computerworld* job satisfaction survey of 600 MIS professionals, 45% of the respondents said they do not set definitive career goals. "Most people don't plan. Their careers develop by chance," says Steven Comstock, a DP training consultant in Denver.

Without a clear strategy for future growth, professionals will miss many of the new opportunities of today's dynamic MIS environment. "A structured approach to career planning is more likely to be successful than an unstructured one," says Judith Larkin, professor of psychology at Canisius College in Buffalo N.Y. "If people take more time to plan, they will achieve more. To be successful, a person must first know what his goals are."

Goal analysis should be part of an overall appraisal of your professional capabilities. But you must also be flexible, Comstock says. For example, five years ago, few professionals predicted the growth of management and support positions in the information center. Career plans need to be adjustable to allow for adding skills to meet the requirements of new, attractive opportunities.

Begin a self-evaluation by listing your strengths and weaknesses as objectively as possible. Then, note your goals for the future. Match the goals against your self-evaluation to see if your strengths and goals coincide. Then, Larkin says, "start generating activities with the assistance of your manager that will aim you toward your goal."

A common mistake many professionals make is that they rely too heavily on their managers to provide a satisfactory career path that will meet their needs. While managers can be of assistance, only the professional can decide exactly what he wants in his future. "The individual must take responsibility. You cannot count on the company," Comstock says. "People must be aware of what the possibilities are in a company."

> "IF PEOPLE take more time to plan, they will achieve more. To be successful, a person must first know what his goals are."
>
> JUDITH LARKIN
> CANISIUS COLLEGE

For you to be satisfied in the long term with your present company, the career options offered must mesh with the goals you plan.

Staying with one company is not everyone's preference, though. There are many professionals who attach themselves to the best job opportunity at the time, regardless of the changes of corporate environment required. The advantage of this approach is usually more rapid movement up the MIS ranks, both in income and position. However, this method sometimes leads you away from your true desires.

"There is a point where frequent leaps from one company to another help, but eventually, they hurt your long-term goals," Comstock says. Employers view constant job changers as people who lack stability, even when the moves are for higher positions and higher pay. Managers are concerned that the prospective employee will lack the commitment to the company and that their investment in the person will be lost as soon as the next hot offer arrives.

But there are times when a move provides long-lasting career benefits. For example, an MIS professional working in an area where the economy is depressed will benefit by finding a job in a more active, major-market area. The major markets offer greater opportunities, and the increase in pay will help you garner more income at future jobs — even if you return to your original region for work. Other reasons to move are less than desirable work conditions and restricted upward growth.

Management vs. technical

A further distinction in planning depends on one major goal option — management or technical. Many professionals enjoy the challenges on the technical side of MIS, but their salary or career growth may be restricted. "Most companies still have a policy that states the only way to achieve greater income is to be promoted to management," Comstock says.

Management promotions can expand a professional's growth potential, but they may not be best for personal goals. Professionals who move to management will find much less time to spend on the technical skills they spent years developing.

Planning an MIS career is one of those things people say they need but rarely do. The benefits of planning your future are the same as planning a software project: The effort is made easier, the problems can be anticipated before becoming major, and the final goal is more achievable.

You may need to adjust goals or time frames, but the final result is a better career. The steps are not difficult. Analyze what you want and what you need to do to attain your goal.

Farmer is a security administrator for Financial Technologies, Inc. in Chantilly, Va.

When You Absolutely, Positively Must Have An Exciting Career.

While we are a technology company, we are first and foremost a people company. The quality of service that has made us the leader in the field is attributable to the energy and skills of the men and women who explore new ways to apply technology to the solution of business communication problems.

DATA BASE ADMINISTRATION
Sr. DBA Analyst/DBA Analyst/Assoc. DBA Analyst

You will design and install IMS Data Bases for Large Scale IBM Systems. All positions require experience in IMS DB/DC Data Base Administration. Experience preferred in: Monitoring data bases for performance, logical and physical data base design, data base reorganization and recovery procedures and utilities, and PSB and DBD creation. These positions require 1 to 7 years experience with at least 2 to 4 years in Systems Development.

All applicants for the above position should respond by forwarding resume indicating your experience and salary history in confidence to: **FEDERAL EXPRESS CORPORATION, P.O. Box 727, Dept. 8520, Memphis, Tennessee 38194, Attn.: Technical Recruiter/JG-1.**

Ours is a unique and creative environment for achievement. Technical resources are superior. Salaries are competitive. And our corporate benefit program is comprehensive. Join a team of dedicated professionals at Federal Express now!

WHY WORK FOR ANYONE ELSE?

FEDERAL EXPRESS

An Equal Opportunity Employer

Cyber Technical Analyst

Advanced Nuclear Fuels Corporation, a Washington State - based company specializing in nuclear fuels engineering and manufacturing, **is seeking an experienced CDC Systems Programmer.**

Position requires BS in Computer Science or equivalent experience. Three years' systems programming with emphasis in CDC operating system support, performance analysis and problem resolution. Knowledge of NOS2, NOS/VE, CCL, NAM, VISTACOM and IM/DM required. Position supports CDC Cyber 180 system with NOS and NOS/VE dual state and provides general purpose utilities, technical direction on machine configuration and migration, network analysis and installation of third party software products.

Qualified candidates please send resumes to: **Advanced Nuclear Fuels Corporation, Employee Relations Department, P.O. Box 130, Richland, WA 99352. We are an Equal Opportunity Employer.**

ADVANCED NUCLEAR FUELS CORPORATION

AN AFFILIATE OF KRAFTWERK UNION
KWU

Put Some Sunshine In Your Computer Career.

If your present computer position is lacking in: challenge, money, working conditions, or future prospects...it's time for a change. After all, a good portion of your life is devoted to your work so it should be a happy situation. NCA can help you to find a better position, either locally or nationally, by providing you with first-rate professional placements services.

Come in. Call. Or mail your resume to the NCA firm nearest to you. No charge to you whatever.

ATLANTA: DataPro Personnel Consultants
400 Perimeter Center Terrace, Suite 650
Atlanta, GA 30346 (404) 392-4242
BALTIMORE: CIPS Inc.
1107 Kenilworth Drive, Suite 206
Towson, MD 21204 (301) 296-9420
BOSTON: Robert Kleven & Co., Inc.
P.O. Box 670
Lexington, MA 02173 (617) 861-1020
CHICAGO: Thomas Hintz & Associates
150 North Wacker Drive, Suite 1700
Chicago, IL 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road
Cincinnati, OH 45237 (513) 821-8273
CLEVELAND: Innovative Resources, Inc.
Stather Office Tower, Suite 430
East 12th & Euclid
Cleveland, OH 44115 (216) 621-4220
COLUMBUS: Michael Thomas, Inc.
450 W. Wilson Bridge Road, Suite 340
Worthington, OH 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants, Inc.
12720 Hillcrest, Suite 530
Dallas, TX 75230 (214) 661-8600
DENVER: Abacus Consultants, Inc.
1777 South Harrison Street, Suite 404
Denver, CO 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel
30000 Town Center, Suite 2580
Southfield, MI 48075 (313) 353-5580
GREENSBORO: DataMasters
P.O. Box 14548
Greensboro, NC 27415-4548
(919) 373-1461
HARTFORD: Compass Incorporated
900 Asylum Avenue
Hartford, CT 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc.
1980 Post Oak Boulevard, Suite 1050
Houston, TX 77056 (713) 626-4100
KANSAS CITY: DP Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, KS 66202 (913) 236-8288
LOS ANGELES: Superior Resources, Inc.
22653 Pacific Coast Highway, Suite 1-106
Malibu, CA 90265 (818) 884-3000
MIAMI: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, FL 33024 (305) 434-8112
MILWAUKEE: EDP Consultants, Inc.
Chancellory Park II, Suite 250
350 N. Sunnyslope Road
Brookfield, WI 53005 (414) 797-8855
MPLS.-ST. PAUL: Electronic Systems Personnel
880 International Centre
900 2nd Avenue South
Minneapolis, MN 55402 (612) 338-6714
NEW JERSEY: Systems Search
90 Millburn Avenue, P.O. Box 751
Millburn, NJ 07041 (201) 761-4400
NEW YORK: Botal Associates, Inc.
7 Dey Street, Suite 410
New York, NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, PA 19063 (215) 565-8585
PHOENIX: Professional Career Consultants
4725 North Scottsdale Road, Suite 200
Scottsdale, AZ 85251 (602) 274-5566
ROCHESTER: Traynor Confidential Ltd.
10 Gibbs Street, Suite 400
Rochester, NY 14604 (716) 325-6610
SAN DIEGO: Technical Directions Inc.
5965 Texas Street, Suite 301
San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: The Computer Resources Group Inc.
303 Sacramento Street
San Francisco, CA 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Assoc.
1940 116th Avenue NE, Box C-90015
Bellevue, WA 98004 (206) 453-2700
SYRACUSE: CFA Associates Personnel Inc.
5790 Widgeon's Parkway
Dewitt, NY 13214 (315) 446-8492
WASHINGTON DC: Bill Young & Associates
8322 Professional Hill Drive
Fairfax, VA 22031 (703) 573-0200
AUSTRALIA: Slade Consulting Group Pty Ltd.
37 Albert Road, Melbourne, Victoria
Australia 3004 (03) 670-1085

National Computer Associates

McDonnell Douglas Corporation requires your Professionalism in St. Louis, Missouri

Security Without Compromise!

McDonnell Douglas Corporation is a major government contractor involved in ongoing projects and competition for contracts that will determine the direction of America's future in aerospace. Security precautions are of paramount concern to our organization. In order to safeguard the next generation defense technology systems we employ security professionals who are of the highest caliber in experience.

We have immediate opportunities for the following security professionals.

COMPUTER SECURITY PROFESSIONALS

Will be responsible for advising and assisting our Security Managers on all matters concerning computer security. Qualified candidates must have a college degree, plus minimum 5 years of directly applicable experience demonstrating a thorough knowledge of the ISM and DIAM 50-Series.

SECURITY PROFESSIONALS

Your background should reflect ability to advise and assist the Security Manager, create and implement security plans and provide security support. Minimum 5 years of experience with Special Security Programs for government, industry or the military is required, plus thorough knowledge of ISM and DIAM 50-Series. Positions include:

- Classification Management
- TEMPEST
- COMSEC
- Security Education
- Information Security

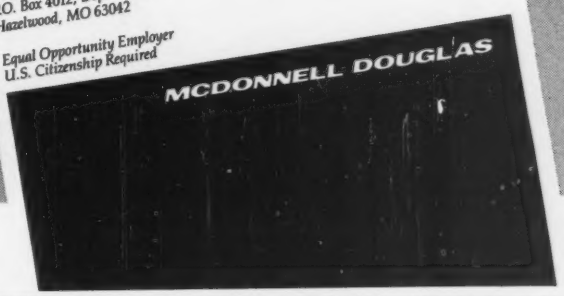
McDonnell Douglas can provide compensation that fully reflects your credentials and performance. A comprehensive benefits package for you and your dependents is included, plus relocation assistance to St. Louis, and merit-based advancement opportunity in our employee-oriented organization.

St. Louis features excellent educational, cultural and recreational facilities, affordable housing options and comparatively low living costs in relation to other metropolitan cities.

For prompt consideration, send your resume in strictest professional confidence to:

Manager, Professional Staffing
MCDONNELL DOUGLAS CORPORATION
P.O. Box 4012, Dept. 62-R700
Hazelwood, MO 63042

Equal Opportunity Employer
U.S. Citizenship Required



PROS

CONTRACT PROGRAMMERS

*VM/CMS
*FOCUS
*DB2
*NOMAD

CALL OR SEND RESUME
DP PROS, INC.
P.O. BOX 2229
BURLINGTON, NC 27216
(919) 222-8030

Programming Supervisor

We are seeking a Programming Supervisor to direct the activities of a team of 4 programmers. Our present system is an IBM System/38, model 700, running Dynamic Control HPMS software, with several Ancillary Systems running on NCR and Control Data equipment.

Requirements include healthcare experience, IBM System/38 plus Dynamic Control HPMS software and RPG III, 1 to 2 years supervisory experience.

The position has significant growth potential in the near future.

Please submit resume and salary expectation to:

SIOUX VALLEY HOSPITAL
Personnel Department
1100 S. Euclid Ave.
P.O. Box 5039
Sioux Falls, SD 57117-5039
1-605-333-7000
An Equal Opportunity/ Affirmative Action Employer

PROGRAMMERS

Permanent and/or Consultant Positions
NY Metropolitan Area

IBM
- Programmers TPF experience

DEC
- Programmers VAX, VMS, Basic

WANG
- Sr. Analysts. COBOL, Speed II, WSN exp a plus

Please call 212-554-3950
Or Submit Resume to:
HANK WALSH ASSOCIATES
475 Fifth Ave, NY, NY 10017

DIRECTOR - MIS - TRANSPORTATION/RETAIL

Major retailer with a large IBM data center in the Midwest has an immediate need for a Director. Must have strong knowledge in transportation distribution and retail MIS functions. This MVS-based organization is planning to establish remote DP sites at exotic international locations, so you should have solid communications and networking background. Must posses exemplary platform skills as you will be reporting to the CFO. Will travel only 10% to 20%. Salary to $70,000. Call today for more information on this great opportunity.

ROBERT HALF
Data Processing
7733 Forsyth Blvd.
St. Louis, MO 63105
314-727-1535

Announcing

IDG COMMUNICATIONS

COMPUTER CAREERS NETWORK

It's new!

And it's your key to reaching the right people in the right places at the right price.

As the world's largest publisher of computer-related newspapers, only IDG Communications can give you this unique method of targeting your recruitment advertising to the professionals you want to reach, where you want to reach them.

You choose the newspapers. There are eight computer and communications-oriented newspapers in the network, reaching every type of computer and communications professional. Depending on who you are looking for, you can choose the publications that suit your needs.

You choose the region. You can advertise nationally in any one newspaper at regular rates, or any combination of publications at special rates. Or you can choose to concentrate in one or more of three regions — East, Midwest and West. You automatically get a three-newspaper buy, *Computerworld, InfoWorld* and *Network World. Then you can add on one or more other publications. For example, if you are in the Boston area, you might want to add the Boston edition of Computer Currents.* Or if you are looking for a VAX programmer in the Midwest, you may want to add Digital News Midwest edition.

You don't have to pay for readers you don't want. When you advertise in the Sunday paper, most of the people you are reaching have nothing to do with computers. But you have to pay for them anyway, since rates are based on total circulation. The Computer Careers Network rates are also based on total circulation, but all of that circulation and readership are computer or communications-involved professionals.

You can reach professionals who aren't actively looking. Our research indicates that roughly 10% of computer professionals may be actively looking for a job at any given time. The other 90% will not be reading the Sunday classifieds. But more than half of computer professionals would consider other job options at any given time if they became aware of them, and those are the hidden stars that you can reach in the pages of their professional newspapers — the ones they read for the information they need to stay ahead.

Computerworld, a weekly newspaper with a total audited reach of more than 650,000 (U.S.) computer-oriented professionals, carries more recruitment advertising than any other specialized business publication. Every week, it delivers the latest news to information systems executives and specialists at medium to large organizations, as well as the executives at the computer industry vendor organizations that serve them. Its readers include MIS directors and managers, systems analysts, programmers, sales and marketing professionals and other computer-involved executives.

InfoWorld is the weekly newspaper edited for personal computer professionals at organizations using multiple systems. It has a total audience (subscribers and pass-along readers) of 420,000, including PC managers, software developers and other PC-oriented professionals.

Network World is the news and features weekly for larger users of communications and networking. Its 220,000 readers (including subscribers and pass-along readers) include voice and data communications managers and specialists as well as communications consultants.

Digital News is a biweekly newspaper for computer professionals who work with the VAX line of computers from Digital Equipment Corporation. Total readership, including subscribers and pass-along readers, is over 210,000, including computer executives and managers, systems analysts, programmers, engineering executives and staff, and other VAX-oriented computer professionals.

Federal Computer Week is edited for information systems executives and staff who work in and sell to the federal government. Its weekly circulation includes MIS executives and managers, as well as systems analysts, programmers, software developers, communications specialists and other information systems professionals. Total readership (including paid and pass-along) exceeds 120,000.

Computer Currents is a group of regional publications edited to meet the needs of business and professional users of personal computers in the region covered.

Computer Currents/Northern California Edition is published biweekly and has a total circulation of 75,000. Total readership exceeds 225,000.

Computer Currents/Southern California Edition is published monthly and has a total circulation of 78,000, with a total readership of 234,000.

Computer Currents/Boston Edition covers the entire eastern Massachusetts and southern New Hampshire area with a monthly circulation of 40,000 and total readership of 120,000.

Circulation plus projected pass-along audience

	EAST	MIDWEST	WEST	TOTAL U.S.
Computerworld	293,032	229,907	127,135	650,074
InfoWorld	171,784	113,414	134,802	420,000
Network World	108,542	62,221	49,237	220,000
Subtotal	**573,358**	**405,542**	**311,174**	**1,290,074**
Digital News	106,468	52,252	53,280	212,000
Federal Computer Week	74,412	20,883	25,083	120,378
Computer Currents				
Northern California Edition			225,000	225,000
Southern California Edition			234,000	234,000
Boston Edition	120,000		120,000	
Total	**874,238**	**478,677**	**848,537**	**2,201,452**

Special low introductory offer — $8.00 per line!

Regional Buys

Here's how to place your recruitment advertising regionally:

The basic recruitment "package" automatically delivers your advertisement in three leading computer newspapers — *Computerworld, InfoWorld,* and *Network World* — AND in the region of your choice. Whether you choose the East, West, or Midwest, you pay just **$8.00 per line.** And if you want, you can add a second region to your three-book buy for a total cost of **$15.00 per line.**

This basic package includes three of the eight newspapers available to you through the IDG Communications Computer Careers Network. You can also schedule *Digital News, Federal Computer Week* and *Computer Currents* (Northern California, Southern California, or Boston edition) — to help you reach all the right people in all the right places.

Regional Combination Buys

	1 REGION	2 REGIONS
Computerworld InfoWorld Network World	$ 8.00	$15.00
PLUS		
1 addition	$10.00	$17.00
2 additions	$12.00	$19.00
3 additions	$14.00	$21.00
4 additions	$15.00	$22.00
5 additions	$16.00	$23.00

Please note: This special introductory offer is valid only through December 31, 1987. Individual contract rates do not apply, and no lower rate is available.

National Buys

And here's how you can buy nationally to get the maximum reach possible:

Sometimes you need national exposure for your recruitment advertising. That's when you can put these advertising opportunities to work for you.

Combination buys. These special combination buys allow you to recruit computer professionals nationally using the combination of newspapers that's right for you.

Choose from: *Computerworld, InfoWorld, Network World, Digital News,* or *Federal Computer Week.*

National Combination Buys

	RATES PER LINE[1, 2]
Combination of 2	$15.00
Combination of 3	$17.00
Combination of 4	$19.00
Combination of 5	$20.00

1) *Computerworld* contract advertisers — Determine your discounted line rate, by deducting the difference between *Computerworld's* open line rate and your current contract rate from the above combination rates.

Example:

$12.60 open line rate
− 11.35 contract rate
$ 1.25 difference

Your discounted rate of a combination of two publications would be $15.00 − $1.25 = $13.75.

2) If your combination buy does not include *Computerworld,* your Computer Careers national rate may be lower. To calculate, start by adding the stand-alone rates of the respective publications (*InfoWorld* — $9.29, *Network World* — $5.00, *Digital News* — $5.00, *Federal Computer Week* — $3.60). Then deduct 10% from the total.

Example:

$ 9.29 InfoWorld
+ 5.00 Network World
$14.29 Total
− 1.43 less 10%
$12.86 discounted rate

To put the IDG Communications Computer Careers Network to work for you, call the sales office nearest you — or contact John Corrigan, Recruitment Advertising Sales Director, at 617-879-0700. Just one quick phone call can give you all the information you need on running your recruitment advertising — regionally or nationally — in up to eight leading industry newspapers.

CAPACITY PLANNING ANALYST

TRAVELERS EXPRESS, a national leader in payment services and electronic funds transfer for the banking/credit union industry, continues to experience steady growth. Our reputation and success in the marketplace has been attributed to our state-of-the-art data processing capabilities. Our current environment includes IBM 30XX and 43XX processors under MVS/XA with CICS and an extensive data communications network. Currently we are seeking an experienced Capacity Planning Analyst to set future direction for our Information Systems Department.

Primary responsibilities for this position will include providing analysis and assistance on efficient application system design; conduct feasibility studies; and provide general reporting on system capacity and usage. Our ideal candidate will possess a minimum of four years experience in systems programming/analysis. Must be familiar with IBM operating systems (MVS/XA preferred), queueing theory and statistical modeling. A two year certificate in Computer Programming or a four year degree in Computer Science is required.

Your talents will be rewarded with a competitive salary and comprehensive benefits package. Should your background match our requirements and you desire further technical challenges, please forward your resume including salary history to:

Travelers Express
A GREYHOUND COMPANY

5075 Wayzata Boulevard
Minneapolis, MN 55416
Attn: Robert Martinez

Equal Opportunity Employer

Now... you can recruit the right people in the right places at the right price.

With the new IDG Communications Computer Careers Network, you can run the most targeted and cost-efficient recruitment program possible. You simply choose the combination of eight leading newspapers - **Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week,** and **Computer Currents**/Northern California, Southern California, and Boston editions - that's right for you.

For all the facts on putting the Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Sales Director, at 617-879-0700.

Sales Offices: **BOSTON:** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; (617) 879-0700; **NEW YORK:** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350; **CHICAGO:** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433; **LOS ANGELES:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164; **SAN FRANCISCO:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (415) 322-3314

SENIOR QUALITY ASSURANCE ANALYST

The Dayton Hudson Department Store Company (DHDSC) is a $1.5 billion division of one of the largest retail organizations in the country, the Dayton Hudson Corporation.

Based in Minneapolis, our MIS division is expanding its Quality Assurance group, and we are looking for a growth-oriented professional to join our team.

Responsibilities of the position include: 1) support of development methodologies and training programs; 2) participation in development task forces, stage revisions and audits; 3) definition and implementation of quality measurements.

Qualifications for this position include 5-8 years of progressive DP experience, including analysis, design, programming and project management, using system development methodologies and procedures. Experience as a Quality Assurance practitioner, along with a relevant undergraduate degree, is desirable.

Candidates should send a resume, including salary history, in confidence to **Michael Tracy, Executive Placement/862, Dayton Hudson Department Store Company, 700 Nicollet Mall, Minneapolis, MN 55402.** Equal Opportunity Employer. Please, no agencies.

DAYTON HUDSON
DEPARTMENT STORE
COMPANY

data processing

COMPUTER PROGRAMMERS

Manufacturing
Retail

Multi-faceted company engaged in retail sales manufacturing, real estate development and finances.

Several openings for programmers with 3-5 years of COBOL experience. Prefer DEC 20/60 or VAX 8600 experience. Positions with retail application development and manufacturing are available. Initial conception and systems development as well as maintenance of installed systems. Data base knowledge a plus. Degree preferred. Would substitute experience.

Excellent opportunity for a self-starter; good career potential and advancement opportunity.

Located in a quiet family oriented community. We offer an excellent benefit and compensation plan. Salary commensurate with experience.

Send resume and salary history to: **ORSCHELIN INDUSTRIES, Human Resources Manager, P.O. Box 266, Moberly, Missouri, 65270.** Equal Opportunity Employer.

It's new! And it's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

You choose the newspapers. Depending on who you're looking for, you can select the combination of eight newspapers that best suits your needs - **Computerworld, Infoworld, Network World, Digital News, Federal Computer Week,** and **Computer Currents**/Northern California, Southern California, and Boston Editions.

You choose the region. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

You don't pay for readers you don't want. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Director, at 617-879-0700. And if you hurry, you can still get in on the special low introductory offer.

Sales Offices: **BOSTON:** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700; **NEW YORK:** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350; **CHICAGO:** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433; **LOS ANGELES:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164; **SAN FRANCISCO:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (415) 322-3314

CHICAGO AREA

DO YOU NEED A ...
COMPUTER PROFESSIONAL?
ANALYSTS, PROGRAMMERS, OPERATORS

Part-time
Full-time
Consulting

CALL

CompuTemps
1821 Walden Office Square
Schaumburg, IL 60173
312-303-6681

PROGRAMMER/ANALYST

Progressive Madison-based insurance corporation seeking a strong application programmer to provide support on an IBM System 38.

- 3-5 years RPG III programming experience on IBM System 38
- 2 year degree or equivalent experience
- Excellent oral and written commmunication skills

Attractive benefits and compensation package. Send resume with salary history by Friday October 9 to:

WEAIT Insurance Corporation
PO Box 7338
Madison , WI 53707
Attn: Personnel
EOE

Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of eight leading computer newspapers.

Call Lisa McGrath at:
(800) 343-6474
for more details.

APPLICATION PROGRAMMER

CW Transport, a major transportation company, located in central Wisconsin has an immediate opening for a programmer. Experience and qualifications should include a minimum of 3 years exp in an IBM DOS/VSE environment using CICS, Assembler, COBOL and VSAM. Send resume to:

Director of MIS
CW Transport Inc.
510 High St.
Wisconsin Rapids, WI 54494
Tel. (715) 424-4500.

EOE

NETWORK PROFESSIONALS

Phoenix

Honeywell Bull is the first truly transnational computer company, an unparalleled venture of Companie des Machines Bull of France, NEC Corporation of Japan, and Honeywell Information Systems. A company with new ideas, new energy and direct access to the leading edge technology of Europe and the Far East, as well as America.

Our Customer Service Division is bringing those new ideas and new energies to the task of providing customer service to one of the industry's largest installed customer bases—10,000 strong. Honeywell Bull CSD is also the established national service provider for over fifty U.S. and foreign computer manufacturers.

We are dedicated to providing state-of-the-art cost efficient solutions to our customers' service requirements.

We seek qualified, self-motivated network professionals with a Bachelor's degree or equivalent in Electrical Engineering or Computer Science, and 3+ years experience with DDP, strong data communications background, including knowledge of SNA or OSI network standards, WAN or LAN, a customer satisfaction orientation, excellent communication skills and an ability to participate directly in consulting projects with clients to join our National Network Center of Expertise in Phoenix, AZ. The following positions are currently open as part of our long-range staffing plan:

- **Network Design Engineers**
- **Network Planning Consultants**
- **Network Support Analysts**
- **Telecommunications Consultants**

Honeywell Bull offers a competitive salary and comprehensive benefits package in a professionally challenging environment.

For prompt consideration, please forward your resume to the attention of David Barriga, Honeywell Bull, MS S46, 2626 W. Beryl Avenue, Phoenix, AZ 85021-1669.

Honeywell Bull

Customers are more important than computers.

Computer Task Group is a nationwide professional services firm which designs, builds, and implements information and automation systems for Fortune 500 companies. Our staff members enjoy great career opportunities, a variety of assignments with top companies, and excellent education and training programs.

Several career positions are now available in the foothills of the smoky mountains at our Greenville, South Carolina office.

For more specific information on how you can join the professionals at CTG, contact us at:

CTG

COMPUTER TASK GROUP, INC.
150 Executive Center Drive, B-117
Greenville, SC 29615
(803) 297-4790

Take the next step! Get in touch with CTG and find out what CTG can mean to you. Come and grow with us.

Equal Opportunity Employer

NEW ENGLAND

BOSTON
CONSULTING P/A'S

Major nat'l. software consult. firm seeks tech. astute P/A's for devel. projs. Must have IBM mainframe COBOL DBMS on-line exp. + willing to relocate. Ideal oppty. for mobile P/A to do long-term assign. in various cities. Salaries to $40,000+reloc.

BOSTON
SENIOR P/A's - CICS

Prominent invest. firm seeks 5 P/A's w/solid IBM MVS CICS exp. for all new devel. tasks. Major co. growth into internat'l. invest. prod. causes expan. of staff. Oppty. to do leading edge apps. w/prog. MIS mgrs. Salary to $40,000+ reloc.

BOSTON
SYS. AUDIT

Nat'ly. recognized corp. seeks accomplished opns. auditor w/exposure to fin'l. rev. & sys. concepts. Outstanding adv. into EDP audit org. w/diverse tech. training oppty. Travel in N.E. to 30% max! Base to $32,000.

HARTFORD
PROG./ANALYST'S

Hfld. area oppty's. for P/A's & S/A's w/CICS & IMS or IDMS exp. 2+ yrs. exp. req'd. for an oppty. to work in state-of-the-art environ. Our client will provide data base training for qualified candidates w/min 2 yrs. COBOL. Paid reloc. Salary to $37,000.

HARTFORD
DB2 CONSULTANT

CT mgmt. svcs. firm seeks indiv. w/1+yrs. DB2 + IMS/MVS tech. bkgrd. to provide training/cons. to "Blue Chip" clients. Some travel req'd. Salary to $60,000+.

HARTFORD
PROJECT LEADERS

Fortune 50 co. seeks proj. leaders. Work in CICS/IDMS environ. on devel. & install. of mfg. sys. Purchase, A/P & fin'l. sys. & pkg. implementation skill a +. Sub. loc. Excellent growth + paid reloc. Salary $42 - $47,000.

ROBERT HALF
DATA PROCESSING
PERSONNEL SPECIALISTS

Contact the Manager of either office listed below.

100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 378-7170

Client Companies Assume All Fees.

OVERSEAS JOBS!

TAX FREE INCOME

Our clients are hiring NOW for:

PROGRAMMERS/ANALYSTS
- **IMS/CICS/ADABAS/IDMS**
- **RPG II, III/ORACLE/PCS**

SYSTEMS PROGRAMMERS
- **PRIMOS/VMS/AOS/MVS**

SOFTWARE ENGINEERS
- **CADCAM/UNIX-C**

TECHNICIANS
- **IBM MF/HP/DEC-VAX**

MANY OTHER FIELDS

Sunday 9:00-3:00
Weekdays 8:30-5:30

(213) 382-9999

OVERSEAS CAREERS OF CALIFORNIA AGENCY

3701 Wilshire Blvd.
Dept. 222CW
Los Angeles, CA 90010

Advance fee required-refundable.
100% GUARANTEE AVAILABLE
Licensed and bonded
as an employment agency.

GUARANTEED RESULTS!!

Lead Applications Systems Analyst/ Programmer

We have an immediate opening in our Paper Group Information Services Department in Boise, Idaho, for a Lead Applications Systems Analyst/Programmer. The successful candidate will have a minimum of 10 years in the profession with at least 5 years of experience on the IBM System 36 with RPGII.

A bachelor's degree in computer science or equivalent experience is necessary. Desire experience with direct user support, communications and a distributed environment. Familiarity with financial, distribution, and manufacturing software applications are a plus. Possibly 10-30% travel.

Boise Cascade offers an excellent compensation package and growth opportunities. If you believe you meet the above qualifications, please submit your resume and salary history to: ***Employment Manager, Employment Services Department, P.O. Box 50, Boise, Idaho 83728.***

Boise Cascade Corporation

We are an equal opportunity employer M/F.

FLORIDA

Dunhill

The National Personnel System.

Exclusive national representation for experienced...

Data Base Analysts/ Administrators—

Data Analysts/ Administrators—

with backgrounds in...

DB2, IMS, IDMS, ADR, SUPRA, ADABAS, ORACLE, TERADATA.

8140 NW 27th Lane, Gainesville, FL 32606
(800)-445-0618
(904)-377-3022 Collect in Florida

SUNBELT

DATABASE ADMINISTRATOR - To supervise and support maintenance and enhancement of relational database projects. Require Bachelor's in Computer Science or related and 4 years EDP experience including Formal Data Analysis, Relational Database Theorems, Recovery and Control Methods, CICS, IMS DB/DC, DBII, and experience as Project Manager. Salary $49,000 per annum. Job location: Los Angeles, CA. Resume to: CW-B4960, Computerworld, Box 9171, Framingham, MA 01701-9171

IMMEDIATE OPENINGS
Coast To Coast • $30-75K

PROGRAMMERS & ANALYSTS
IBM 30XX • IDMS • ADS/O
Data Center & Production Applications
RIDDICK ASSOC.
P.O. Box 61444, Virginia Beach, VA 23462
804-461-3954

Programmers & Analysts
Penna. & Nationwide
MECK ASSOC.
1517 Cedar Cliff Dr., Camp Hill, PA 17011
717-761-4777

Client cos. pay employment fees

CONTRACT PROGRAMMERS

We have immediate openings for senior programmer analysts with a minimum of 4 years experience with one the following skills: IMS, DB/DC, COBOL, ADF, IDMS, ADSO, FOCUS, NOMAD, Model-204, Prime 9000 Series, CICS, Mark IV. We offer a major medical plan, our rates start at $30/hr., we have openings in Los Angeles, CA, Houston, TX, St. Louis, MO, Oklahoma, VA, and Cleveland, OH. For career opportunities please send resume to:

J.P.S., Inc.
Attn; George Johnson
PO Box 990007
Houston, TX 77299-0007

or call 713-820-0024. No trainees or part-time positions available. We are an Equal Opportunity Employer.

DESIGN ENGINEER - Designs plastic mold system, facilities & components. Coordinates, plans, analyzes & implements construction, operation & design of systems equipment, layout, & Production system. Analyzes operating efficiency & recommend additional facilities to improve product and production. Must be able to operate computer. Must know 2-D & 3-D computer graphics & APL language. MS in Mechanical Engineering + 1 yr 3 mos exp. or BS + 3 yrs 3 mos exp. req'd. Job Site/Interview: Paramount, CA. $3,213.00/mo. 40 hrs/wk. Send this ad and a resume to Job No. MLU #9430, PO Box 9560, Sacramento, CA 95823-0560 not later than 10/12/87.

RSVP SERVICES

• ANALYSTS • PROGRAMMERS
SOFTWARE/HARDWARE

Multiply your opportunities

With a network of over 1000 client companies and 200 affiliate employment agents nationwide, RSVP can selectively communicate your credentials to companies offering literally hundreds of choice, current career opportunities, clear across the nation.

We guide, you decide

Our no-obligation, no-pressure employment services to degreed, experienced U.S. citizens and permanent residents include resume development and interview arrangement.

If you qualify, call Howard Levin or Maureen McCue at 800-222-0153 or (in NJ) 609-667-4488, or send your resume to either address listed below. Our client companies pay all costs.

RSVP SERVICES
One Cherry Hill Mall, Suite 700, Dept. C • Cherry Hill, NJ 08002

Dublin Hall, Suite 201, Dept. C
1777 Walton Rd. • Blue Bell, PA 19422
(mail address only)
Member Firm
computer/net
national placement network

Computer

SENIOR P/A PAID OVERTIME

Analysts International Corporation is currently hiring professionals with experience in the following:

- IBM/COBOL/IMS DB/DC or IDMS/ADSO
- IBM/FOCUS/COBOL
- DEC VAX/COBOL
- IBM/ADABAS/NATURAL
- IBM/COBOL/CICS
- IBM/BAL/LIFECOMM
- HONEYWELL DPS8/ COBOL/IDS/DMIV

We offer a career opportunity with an excellent salary, comprehensive benefit packages, paid overtime, and other incentives to qualified candidates.

We invite you to call Jenn Harenza at 1-800-328-9929 or send resume to:

Analysts International Corporation
7615 Metro Blvd.
Minneapolis, MN 55435
Equal Opportunity Employer

BOSTON EDP CONSULTANTS

We currently have a number of contract as well as full-time openings with clients in the Boston area financial community. Individuals must have proven track records from Large Scale, State-Of-The-Art IBM environments. Experience within any of the following areas is essential:

- MUTUAL FUNDS
- SECURITIES (SMAC)
- PORTFOLIO MANAGEMENT
- GLOBAL ACCOUNTING
- TRANSFER AGENT RECORD KEEPING

Please mention this ad when you call or forward your resume to Wayne at:

(617) 894-9500
Member NACCB

DASI

Data Arts Sciences, Inc.
Contract Software Services
13 Riverside Office Park
Weston, MA 02193

Get a quick update on today's computer opportunities...FREE!

Our single largest listing of jobs; many available exclusively through Source

Source Edp's new computer-generated publication, **Fast Track**, can help you get a quick update on what career opportunities have just become available. Fast Track is organized geographically, so you can explore opportunities in your home town, city or anywhere else across the country. Eastern, Central and Western States editions are available.

Whether you're in programming, systems analysis, software engineering, computer sales, marketing, technical support or management, Fast Track can quickly show you what's happening in the job market. Details about each position — including salaries — are cited.

Call Source Edp for your free copy. As the leading recruiting firm that specializes exclusively in the computer profession, we can provide the expert assistance that your career deserves.

Our staff is comprised entirely of computer professionals. So you'll always get sound advice in selecting the best career path alternatives. And, of course, there is never any obligation or expense to you since our client companies assume our charges.

FAST TRACK
COMPUTER CAREER OPPORTUNITIES
A computer-generated listing of new position openings from $25,000-$130,000
source edp

Call now

United States:

Alabama
Birmingham ... 205/322-8745

Arizona
Phoenix ... 602/279-1010
Tucson ... 602/792-6875

Arkansas
Little Rock ... 501/372-2620

California
Northern
Mountain View ... 415/968-4910
Sacramento ... 916/448-3478
San Francisco ... 415/434-2410
Silicon Valley ... 408/737-3424
Walnut Creek ... 415/945-1910
Southern
Fullerton ... 714/738-1313
Irvine ... 714/660-1898
Los Angeles
Downtown ... 213/688-0041
South Bay ... 213/540-7600
West ... 213/203-8111
San Diego ... 619/573-0100
San Fernando Valley ... 818/905-1500

Colorado
Colorado Springs ... 303/632-1717
Englewood ... 303/773-3700

Connecticut
Danbury ... 203/797-9388
Hartford ... 203/522-6590
Meriden ... 203/235-8642
New Haven ... 203/787-4595
Stamford ... 203/967-4888
Stratford ... 203/375-7240
Waterbury ... 203/574-5633

Delaware
Wilmington ... 302/652-0933

District of Columbia
Washington D.C. ... 202/293-1255

Florida
Fort Lauderdale ... 305/491-0145
Jacksonville ... 904/356-1820
Melbourne ... 305/725-3065
N. Miami Beach ... 305/940-1014
Orlando ... 305/282-9455
Pinellas ... 813/443-6480
Tampa ... 813/222-0007

Georgia
Atlanta/Downtown ... 404/588-0350
Atlanta/North ... 404/953-0208
Atlanta/Perimtr.-400 ... 404/255-2045

Illinois
Chicago/Loop ... 312/372-1900
Oak Brook ... 312/986-0422
Peoria ... 309/673-0274
Rolling Meadows ... 312/392-0244

Indiana
Fort Wayne ... 219/432-7333
Indianapolis ... 317/631-2900

Iowa
Des Moines ... 515/243-0191

Kansas
Overland Park ... 913/888-8885
Topeka ... 913/232-6722
Wichita ... 316/688-1621

Kentucky
Louisville ... 502/581-8900

Louisiana
New Orleans ... 504/561-8000
Shreveport ... 318/222-6186

Maryland
Baltimore ... 301/727-4050
Columbia ... 301/730-4833
Greenbelt ... 301/441-3700
Rockville ... 301/258-8800
Towson ... 301/321-7044

Massachusetts
Boston ... 617/439-6240
Burlington ... 617/273-5180
Springfield ... 413/739-4083
Wellesley ... 617/237-3120

Michigan
Detroit ... 313/259-7807
Grand Rapids ... 616/459-8539
Lansing ... 517/484-4281
Southfield ... 313/352-8020
Troy ... 313/362-9070

Minnesota
Bloomington ... 612/835-5100
Minneapolis ... 612/333-6468
St. Paul ... 612/227-6100

Missouri
Clayton ... 314/862-3800
Kansas City ... 816/474-3393
St. Louis, Westport ... 314/576-4444

Nebraska
Omaha ... 402/346-6709

New Hampshire
Nashua ... 603/888-7600
Salem ... 603/893-7311

New Jersey
Atlantic City ... 609/345-2444
Cherry Hill ... 609/488-5400
Clifton ... 201/473-5400
Edison ... 201/494-2800
Freehold ... 201/431-2332
Morristown ... 201/267-3222
Paramus ... 201/845-3900
Princeton ... 609/452-7277
Somerset ... 201/469-9444

New Mexico
Albuquerque ... 505/247-4270

New York
Albany ... 1-800-777-JOBS, ext. 10
Buffalo ... 716/855-0400
New York City
Grand Central ... 212/557-8611
Penn Station ... 212/736-7445
Wall Street ... 212/962-8030
Rochester ... 716/263-2570
Syosset, L.I. ... 516/364-0800
Syracuse ... 1-800-777-JOBS, ext. 10
White Plains ... 914/694-4400

North Carolina
Charlotte ... 704/552-6577
Greensboro ... 919/379-1155
Raleigh ... 919/847-7005

Ohio
Akron ... 216/535-1150
Beachwood ... 216/292-6190
Cincinnati ... 513/651-3303
Cleveland ... 216/771-2070
Columbus ... 614/224-0660
Dayton ... 513/461-4800
Toledo ... 419/242-2601

Oklahoma
Oklahoma City ... 405/722-7410
Tulsa ... 918/599-7700

Oregon
Portland ... 503/223-6160

Pennsylvania
Allentown ... 215/776-0524
Harrisburg ... 717/761-8790
King of Prussia ... 215/341-1980
Philadelphia ... 215/988-1717
Pittsburgh ... 412/281-6540
Reading ... 215/374-6230

Rhode Island
Providence ... 401/751-0665

South Carolina
Columbia ... 803/256-7448
Greenville ... 803/271-7044

Tennessee
Chattanooga ... 615/265-8880
Memphis ... 901/525-0743
Nashville ... 615/256-0825

Texas
Austin ... 512/472-0100
Dallas
Central ... 214/954-1100
North ... 214/387-1600
Northeast ... 214/669-1100
El Paso ... 915/532-6316
Fort Worth ... 817/338-9300
Houston
Downtown ... 713/751-0100
San Antonio ... 512/689-0100

Utah
Salt Lake City ... 801/966-3900

Virginia
McLean ... 703/790-0810

Washington
Seattle ... 206/454-6400
Spokane ... 509/838-7677

Wisconsin
Green Bay ... 414/432-1184
Madison ... 608/251-0104
Milwaukee ... 414/277-0345

Canada:

Alberta
Calgary ... 403/270-1940
Edmonton ... 403/488-1183

British Columbia
Vancouver ... 604/222-1155

Manitoba
Winnipeg ... 204/942-1151

Ontario
Mississauga ... 416/848-3344
Toronto ... 416/361-1110
Willowdale ... 416/495-1551

source edp
Computer Recruiting Specialists

Client companies assume our charges.

Source Edp, Department 0724, P.O. Box 7100, Mountain View, CA 94039.
When writing, please include your title.

HELP WANTED: System Software Engineer

PLEASE SEND RESUME TO:

EMPLOYMENT SECURITY DEPARTMENT
ES DIVISION, ATT: AEC # 45958
OLYMPIA, WASHINGTON 98504

JOB DESCRIPTION: System Software Engineer, Operating Systems Group. Designs, implements, and tests complex and high level systems and software for microcomputers and processors. Works with other engineers to design WINDOWS operating systems software utilizing C and Assembler 86 languages, and 386-based 32-bit computers. Designs and implements virtual memory/demand paging and device drivers in operating systems software. Assumes major project responsibility including: 1) requirements and analysis of project specifications; 2) product design; and 3) implementation schedules.

REQUIREMENTS: B.A. or B.S. in Mathematics, Computer Science, Electrical Engineering or Physics. Computer Software Design or programming: 6 months' employment experience utilizing C and Assembler 86 languages, 286-based and 32-bit computers, and designing virtual memory/demand paging and device drivers for operating systems software.

SALARY: $27,000 per annum. Position located in Redmond, Washington. EOE.

Staff Systems Programmer - Responsible for providing computerized systems, artificial intelligence support to enhance the effective control & reporting of trading activities. Participate in all phases of a systems development life cycle. Code programs in natural language, test programs which have been coded by using sample data and preperation of documentation to turn those programs over to production. Participate in overall systems testing as required. Participate in department processes such as trainee recruitment and stress systems testing. Will interface with data center operations to coordinate testing & production requirements. Responsible for design, development and maintenance of firm wide investment control system consisting of 75,000 lines of online batch code. System run under JCL. Teach Introduction to APL class in training program, provide APL user support. Must have MS Computer Sci or Math or Engineer using computer plus 6 mos. training in MIS major investment banking house. Additionally must have one year in job being offered or one year in systems programming. Must have experience in COBOL, Assembler, PL/1, JCL, Natural and APL Computer languages. 40 hr./wk., 9-5, Salary $38,000. Must have U.S. employment authorization.

Send resume in duplicate to: #38 BD, Room 501, One Main Street, Brooklyn, N.Y. 11201.

DATA PROCESSING OPPORTUNITIES
1-800-423-5383

We are national award winning DP specialists. Through our national association with NPA we have over 200 offices around the country ready to work for you! Some of our **HUNDREDS** of current needs include:

LIFE INSURANCE	**To $80K**
SYSTEM/38	**To $40K+**
PL/1 and IMS	**To $45K**
IDMS, IMS or ADABAS	**To $50K**
P/A (COBOL or ALC)	**To $40K**
CONSULTING	**$ OPEN**
MVS or VM INTERNALS	**$ OPEN**
ACF/VTAM/NCP	**To $50K**
DATACOM/IDEAL	**To $50K+**
DB2/SQL	**To $60K+**
COBOL/CICS	**To $40K**

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. C
Houston, Texas 77289-0723

SYSTEMS PROGRAMMER

We have an immediate need for a recognized expert on the RSX11-M Based Systems.

Requirements include minimum of 5 years experience as systems programmer.

Thorough knowledge of Decnet, Assembler, FMS required. Knowledge of VAX/VMS would be an advantage.

Please send your resume to:

COMPUTER DEPARTMENT
P.O. Box 86726, Riyadh 11632
Saudi, Arabia
Attn: Mr. Samibadran

DATA PROCESSING

Advanced Systems Division

DATA BASE SPECIALISTS

Call Ellen Cane Collect at (714) 250-0437 to Arrange an Interview

Northrop Advanced Systems Division in Pico Rivera, Southern California, is searching for Data Base professionals to work with the most sophisticated IMS DB/DC systems in the business, and participate in evolving technologies including relational and distributed DBMS. You'll work with the most advanced technology in an environment which earned us a listing in *The 100 Best Companies To Work For In America.*[1] If you're qualified, call Ellen and meet the challenges of this position

Senior level and specialist level positions are available for individuals with at least 8 years data processing experience including IMS DB/DC applications analysis and programming, and 3-5 years recent background as a Data Base Analyst or Administrator in an IMS DB/DC and DB2 environment. Background including Manufacturing, Engineering and/or Logistics applications preferred.

You will perform data analysis, modeling and normalization activities in support of a three-schema, data driven approach to application systems development. You will also develop logical and physical data structures, supervise test and production data base maintenance and support activities, provide for data base performance analysis and tuning activities. Develop data base related standards and procedures.

If unable to call, please send your resume including salary history to: Steven Martin, NORTHROP ADVANCED SYSTEMS DIVISION, Employment Office, Dept. CW2526, P.O. Box 1138, Pico Rivera, CA 90660-9977. Northrop provides its employees with a competitive, comprehensive benefits package.

MODEM USERS: You can access a complete listing of career positions now available with your home computer and a modem. Dial **(612) 941-5723** and enter the password "Career Access" for 24-hour information. ***Bit settings: data 8, stops 1, no parity, full duplex 300/1200 baud, enter password (Career Access), (CR) upon entry.***

U.S. CITIZENSHIP REQUIRED. Northrop is an Equal Opportunity Employer M/F/H/V.

[1]Levering, Moskowitz and Katz; *The 100 Best Companies To Work For In America*, © 1987, by New American Library, reprinted by arrangements with Addison-Wesley Pub. Co. Inc., Reading, MA 01867.

NORTHROP

Advanced Systems Division

DISOSS ADMINISTRATOR PROJECT SPECIALIST

We are a major Wall Street investment bank and brokerage firm seeking an innovative professional with strong working knowledge of both DISOSS and CICS. Excellent communication skills are essential, as the individual selected will act as a liaison between users and the programming staff.

This individual must have the ability and experience to coordinate the efforts of all new and existing CICS software. In addition, responsibilities include the administrative and technical support of DISOSS.

We offer a competitive salary, extensive company benefits, and an environment conducive to personal growth and professional achievement. If you are interested in this unique career opportunity, please send your resume along with salary history to:

Dept. 312175
1501 Broadway, NY, NY 10036
An equal opportunity employer

CONSULTANTS

Advanced Programming Resolutions, Inc., a dynamic, growth-oriented, computer consulting company, has consulting positions available in Chicago, Columbus, and Dayton, Ohio.

APR provides you with an excellent salary, comprehensive benefits package including major medical, dental, long-term disability and a 401K pension plan, and the opportunity for professional growth and development.

Engineering Consultants for Chicago and Columbus requires:

- B.S. in Computer Science; M.S. a plus
- (1) year or more work experience in any of the following areas:
  - *Real-time software design and development within a UNIX/C environment
  - *Call processing software design and development
  - *Switching system requirements and architecture
  - *System integration, system testing, and device drivers
  - *Operating systems development, and local area networks

Business Systems Consultants for Columbus and Dayton requires:

- (3-5) years minimum working experience in any of the following areas:
  - *IDMS, IMS DB/DC, ADSO, CICS
  - *ROSCOE, DATATRIEVE, VSAM, VTAM, OS JCL
  - *COBOL, PL/1, ASSEMBLER, FORTRAN
  - *MANTIS, NATURAL, IDEAL, ADABAS
  - *VAX/VMS, DOS/VSE, VM, MVS
  - *NCR environments

OUR SUCCESS IS OUR PEOPLE!

Please submit your resume to:

Robert D. Williams
Technical Resources Manager
Advanced Programming Resolutions, Inc.
2715 Tuller Parkway Drive
Dublin, OH 43017

Minorities and Hispanics are encouraged to apply
An Equal Opportunity Employer M/F/H/V

UNIX is a trademark of AT&T Bell Laboratories

APR
An AGS Company

Research Staff member - Rsrch in interconnection of hi-performance processors for multiprocessor computer systems. Rsrch into new architectures for switching ntwrks. Dev math models for evalustion of performance & reliability of ntwrks. Wrk w/hrdwr & sftwr designers in implementation of ntwrks. Thoro k/of state-of-the-art in areas of interconnection ntwrks, parallel processing & fault-tolerant computing req'd. Strng theoretical bckgrnd in discrete math, graph theory & probability theory, as well as familiarity w/basic hardware design techniques, are essential. Must be able to effectively communicate results of wrk for intrnl & xtrnl presentation & or publcation. PhD in Comp Eng + 1 yr in job offered or 1 yr rsrch in interconnection ntwrks req'd. (Rsrch exp may be obtained at grad or post-doc level). 40 hr/wk; 8:30-5:12pm; $55,000/yr; position loc in Westchester Cnty; E.O.E. Send resume or letter only in duplicate describing qualifications to: #44BD, Room 501, One Main Street, Brooklyn, NY 11201.

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM, Global, DCS, IDMS, MIS, Adabas, Oracle/DB2, SQL, ADR Datacom or Ideal, VM, CMS, Nomad, Financial, Mfg, Banking, ATM, DSDF, Claims Processing, MRP, MSA, MVS, ACF, IMS, or CICS Systems Progrs, Capacity Planners, Best 1, Telecom Analysts, DB Analysts, Info Center Analysts, S/38 RPG II, DEC VAX Mfg, or scientific DC Method/1, Spectrum 2, SDM Prod. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 210
Raleigh, NC 27609
(919) 782-3021

PROGRAMMER
CULPRIT/EDP AUDITOR
$31,000

LEADER IN SECURITIES INDUSTRY offers advancement opportunities & immediate challenges. 6 months-1+ yrs CULPRIT programming will allow you to enter the lucrative world of EDP auditing. No travel involved.

ROBERT HALF
OF NEW YORK, Inc.
522 Fifth Avenue
New York, NY 10036
212-221-6500

Visiting San Francisco?

Let us know when you are arriving and we may arrange that you stay forever!

DATA PROCESSING PROFESSIONALS skilled in Main Frames, Minis or Micros, **Data Base** or **On-Line Systems**, consider a move to the beautiful SAN FRANCISCO BAY AREA.

LOGICAL OPTIONS
Incorporated Agency — Est. 1975
One Market Plaza, Spear Tower, Suite #2014A
San Francisco, CA 94105 • (415) 777-3900

SR. PROGRAMMER ANALYST

Colorado Springs, CO

Current, Inc., a leading national manufacturer of greeting cards and fine stationery items has an opening for a Senior Programmer Analyst. This position will support the Marketing Promotional, Mailing and Analysis Systems.

Requirements for this position are:

- 4 year degree in IS, CS or equivalent experience
- 3-5 years structured COBOL
- Honeywell H6000, L66 or DPS 88 experience
- DMIV/IDSII transaction processing and time-sharing
- Fourth Generation Language experience desired
- Excellent written and oral communication skills mandatory

Current offers a competitive salary and compensation package in a creative and stimulating environment. Send resume, salary history in confidence to: CURRENT, INC., Dept. 34-CW, P.O. Box 2559, Colorado Springs, CO 80901, Attn: Nancy White.

CURRENT, INC.

Equal Opportunity Employer

Maximize Your Opportunities

Consulting may be the right move for you.

Your next career move can give you more technical diversification, a better grip on continuing career progress, more responsibility and much better compensation.

We're Global Computer Corporation, a rapidly growing data processing consulting firm with offices in four markets. We're recruiting data processing pros who are interested in consulting and who have solid capabilities in one of the following areas:

- **Accountants (Systems Design)**
- IBM and DEC System Professionals
- Data Processing Recruiters
- Sales Representatives
- **Limited Entry Level Positions**

If you're considering a change, let's sit down and discuss the career and financial advantages of joining the Global Computer team as a full-time consultant. To pursue these opportunities in utmost confidence call collect or write Bob Parsons, Global Computer Corporation, Technical Support Services, 6500 Busch Blvd., Suite 210, Columbus, Ohio 43229, (614) 846-0260. (No agencies please.)

GLOBAL COMPUTER CORPORATION

An Equal Opportunity Employer

SPERRY (EXEC) SYSTEMS PROGRAMMERS

United Airlines' sophisticated Sperry system is an integral part of our overall MIS technology, as it provides the critical information required for flight operations from flight crew management and weather information to aircraft routing and flight planning.

Responsible for performing system changes, applications programming support and systems programming including diagnostics, tuning, maintenance, generation and installation of associated software program products. We operate Sperry 1100/93 mainframes in a distributed NODAL system, utilizing multiple DCP-40 communications processors. Candidates should have 2 or more years systems experience with EXEC 1100 (currently at 39R3D). CMS 1100 and TELCON a plus.

United offers an exceptional compensation package including reduced fare air travel privileges and relocation assistance. Send a resume with salary history in confidence to: **Professional Employment/CW09-039, United Airlines, P.O. Box 66100, Chicago, IL 60666.** *Equal Opportunity Employer.* **Principals only please.**

UNITED AIRLINES

The World Is Looking Up To Us.

FLORIDA

PA SYS 38 COBOL RPG	to 36K
PA CICS PL/1	to 40K
SE PROD DEV C, LAN, PC's	to 35K
S & P MGR DISTRIBUTION	to 43K
MGR VOICE & DATA	open
INFO CENTER MGR	open
PA HONEYWELL IDS 2 DMIV	to 35K
PA CICS COBOL	to 38K
SR CONSULTANT HEALTH-CARE IBM	to 60K
INFO CTR ANAL FOCUS	to 45K
PA FOCUS	to 36K
PA OS/MVS COBOL MFG	to 39K
PA CICS DL/1	to 42K
PA IMS DB/DC	to 36K
SE PROD DEV C,X.25	to 50K
PJT LDR MSA PACKAGES	to 50K
PA CICS BANKING	to 35K
PA GROUP LIFE INSURANCE	to 35K
SE PROCESS CONTROL C, PASCAL	to 45K
DESIGNER INSTALLER LAN	to 34K
SYS PROG DOS/VSE	to 50K
PA HP 3000 FORTRAN	to 33K
PA MSA PACKAGES	to 32K
OPS MGR OS/MVS	to 38K
SA ADABAS COBOL	to 38K
PA VECTOR PACKAGES	to 32K
PA SERIES 1 EDL	to 40K
SYS PROG OS/MVS	to 33K
DBA ADABAS	to 40K
PA FLA SOFTWARE	to 32K
PA INFORMIX	to 37K
PA M & D PACKAGES	to 36K
DBA IMS DB2	to 50K
PA COBOL PAY/PER	to 37K

Many other permanent and contract positions available locally and nationwide.

COMPUTERPEOPLE

12225 28th Street North
St. Petersburg, FL 33702
(813) 578-2878
or
2005 W. Cypress Creek Rd.,
Suite 3, Ft. Lauderdale, FL 33309
(305) 771-8603

APPLIED MATHEMATICIAN/ COMPUTER PROGRAMMER: Astronautics Corporation of America is looking for an applied mathematician/computer programmer to work in the Thermo-Magnetic Devices Department. The position requires development of mathematical methods for the calculation of magnetic fields and forces of superconducting magnets. The forces and fields must be calculated throughout the magnet windings so that internal stresses on the form and wires can be assessed. The geometry of the windings must also be completely general so that solenoids, ellipses, toroids, racetracks, dipoles, quadrupoles, etc. can be modeled. The methods must be able to calculate magnetic forces among several coils and between coils and shielding or other magnetic material. It is expected that an interactive computer code with graphics output will be produced for operation on a VAX 11/780 computer. Strong interaction with other members of a new product design team will be expected.

A Masters Degree in applied mathematics or mathematical physics is required. Four years experience in Applied Math or Applied Physics is required. The four years must include: at least three years experience with magnetic materials, super conducting magnets, and cyrogenics. At least three years experience with computer operating systems, i.e., the VAX 11/780, experience with Maxwell's equation or similar field equations. The job consists of a 40 hour work week.

The successful candidate for this position will be expected to become an integral part of a design team on new magnetic refrigerators for a variety of cooling applications. At least three years experience with mangetic materials, superconducting magnets and cyrogenics is required. Starting salary is $38,500.

Contact: Roger Templar, Milwaukee North Job Service Office, 6087 North Teutonia Avenue, Milwaukee, WI 53209, 414/438-2020.

With your experience in data processing and our access to better positions, isn't it time you met Robert Half?

There's one good way to make the most of your job experience in data processing. Combine it with ours!

Ever since the computer revolution began, our offices have been helping thousands of data processors find better jobs. Jobs with fine companies. Jobs that meet the requirements of the professional looking for a challenging future. And there's a good chance that we can even find the right job in the exact location you select— around the corner or around the world. You see, we've got 116 offices on three continents** which gives you maximum exposure to what you want, and where you want it.

In data processing experience means everything. Yours and ours. Put it to work today by calling a nearby Robert Half office. You'll be glad you did.

ROBERT HALF®
DATA PROCESSING

*Founder of Robert Half International Inc. and author of "Making It Big In Data Processing," Crown Publishers (July 1987).

**Most offices independently owned and operated.

© 1987 Robert Half International Inc.

PROGRAMMER ANALYST

SCS, Inc. is a rapidly expanding computer marketing company which serves the needs of local governments. We offer a challenging, sophisticated environment at our corporate headquarters in Wilson, a growing eastern North Carolina community.

We seek individuals with the ability and desire to work independently in the development of systems using on-line, real-time, data base techniques. These positions require a four-year degree/equivalent and at least 2 years experience developing commercial applications using COBOL. Experience with IBM DOS/VSE, MANTIS, and/or TOTAL Data Base is desired.

SCS provides a competitive salary and excellent benefits. For confidential consideration, please send resume, outlining your professional accomplishments and salary history to: SCS, Inc., P.O. Box 466, Wilson, NC 27893. An Equal Opportunity Employer.

SCS
STANDARD COMPUTER SYSTEMS

D.P. Professionals

COBOL/CICS	UNIX/C
IDMS/ADSO	IBM 4700/FCL/ABCS
IMS/PL/1	DB 2
FOCUS	IMS DB/DC
CICS/PL/I/ or DL/1	IMS DBA
ORACLE	TANDEM
MVS SYS	BURROUGHS COBOL

PART-TIME/FULL TIME

★ TOP RATES ★ LOCAL/NATIONAL
★ NEW PROJECTS ★ LONG/SHORT TERM
★ WEEKLY PAY ★ BEST SELECTION

- Analysts
- Programmers
- M.I.S.
- Operators
- Data Base Designers
- Telecommunications
- S.W. Engineers
- Documentation

The Experts

One Washington St.
Wellesley, MA 02181
617-237-1777

6133 Rockside Rd - II
Independence, OH 44131
216-642-3840

8911 Richmond Hwy
Alexandria, VA 22306
703-765-8900

4401 W. Tradewinds Ave.
Lauderdale-by-the-Sea, FL 33308
305-776-5300

CSX FOCUSES THE BEST MINDS WHERE THEY MATTER MOST!

If you have at least two years of applications or systems software development experience we would like to talk to you about a challenging and rewarding consulting position with CSX TECHNOLOGY.

CSX TECHNOLOGY is the commercial data services division of CSX Corporation - America's leading transportation and natural resources company. Our Professional Services unit is one of the fastest growing data processing consulting firms in the nation providing technical consulting services to leading FORTUNE 500 companies and state and national government agencies throughout the country.

Because of our rapid growth, CSX TECHNOLOGY is currently looking for data processing professionals to fill a variety of positions. We have assignments available for junior and senior level programmers and programmer/analysts. These assignments require one or more of the following skills:

IMS DB DC	CICS	MODEL 204
HP 3000	POWERHOUSE	ADAGER
FOCUS	COBOL	DL 1
MSA	STRUCTURED METHODOLOGY	
ANALYTICAL ANALYSIS		

CSX TECHNOLOGY provides an excellent compensation package including an above average salary and a wide range of benefits including relocation assistance. Our state of the art data processing and training center is utilized to enhance the skills of our employees on an on-going basis.

Call or send your resume to:

CSX TECHNOLOGY
550 Water Street, Suite 500
Jacksonville, Florida 32202
(904) 632-8699

* Offices in Jacksonville, Tampa, Charlotte, Raleigh N.C., Columbia S.C, Louisville, Nashville, Deerfield, Il.

* Equal Opportunity Employer

CSX TECHNOLOGY

Data Processing Professionals

STEP UP TO CONSULTEC!

Programmer Analysts
Senior Programmer Analysts
Systems Engineers

CONSULTEC, INC., a national leader in systems development for on-line, interactive data base applications, is growing rapidly. We seek a select group of competent and ambitious individuals to become a part of this exciting long-term growth.

Current positions, involving the design and development of on-line data base applications exist in:

HARTFORD, CONNECTICUT
ATLANTA, GEORGIA
COLUMBUS, OHIO
TALLAHASSEE, FLORIDA
RALEIGH, NORTH CAROLINA

The ideal candidates will be degreed and have three or more years of programming experience using COBOL on IBM/OS/MVS mainframes with good technical skills in VSAM, JCL, IMS or CICS.

We are **not** a contracting firm. We design, develop and implement large, complex high-volume systems on a project basis and our staff consists of the very highest caliber of talent. Training in data base or on-line development, growth into management, and relocation assistance are offered.

CONSULTEC offers the qualified candidates competitive compensation, excellent benefits and an outstanding environment for professional development. If you meet our requirements, send your resume in confidence or call today: **H.W. Burmeister, Manager of Recruiting, CONSULTEC, INC., 6065 Roswell Road, N.E., Suite 800 Northside Tower, Atlanta, GA 30328, (404) 252-2883 or 1(800) 358-2381.**

We are an equal opportunity employer.

Consultec, Inc.

SOFTWARE ENGINEERS PROGRAMMERS/ANALYSTS

Commercial Programming Systems is an established Southern California service firm offering Consulting and Contract to Hire services. We are seeking experienced Software Engineers and Application Analysts and Programmers with the following experience:

SOFTWARE ENGINEERS
- FOCUS
- ADA
- MIL STD 2167
- Displays/Controls
- Expert Systems
- Guidance/Navigation
- IV & V

ANALYSTS/PROGRAMMERS
- ACP/TPF
- International Fares
- CARGO
- Commercial Loans
- Mortgage Loans
- Systematics Banking System
- Manufacturing
- IMS DB/DC
- McCormack & Dodge Products
- CICS

Locations include Southern California, Florida, Texas and Oklahoma.

We offer competitive salaries, Life & Health Insurance, paid holidays, vacations, bonuses and relocation assistance. Explore your options with us today, call (213) 380-2681 collect or send your resume to:

COMMERCIAL PROGRAMMING SYSTEMS, INC.
3400 W. 6th Street, Suite 209
Los Angeles, CA 9002

cps

SPECTRUM
Technology Group, Inc.

A NEW OUTLOOK ON CONSULTING...

Spectrum knows that top computer Professionals are the only way to succeed in the consulting business.

As a consulting organization specializing in Data Base Technology, we are committed to provide you:

— Technical Challenge
— Training-in house and off site
— Professional Growth

We are looking for Professionals with Experience ...

Using Data Bases:
DB2 IMS INFORMIX IDMS

Together With:
CICS COBOL PL1 C

In These Environments:
MVS UNIX VAX/VMS

We offer an excellent benefits package and salaries commensurate with experience. For consideration send your resume to the appropriate office.

FLORIDA
Terry Wilkes
1110 Douglas Ave.
Suite 2040
Altamonte Springs, FL. 32714

WASHINGTON, D.C.
Jill Camp
One Metro Square
51 Monroe Street, Suite 1210
Rockville, MD 20850

NEW JERSEY
NEW YORK/
Al Perry
1250 Route 28
P.O. Box 5365
North Branch, NJ 08876

An Equal Opportunity Employer M/F

KENDA SYSTEMS, INC.

BOSTON
NEW YORK
WASHINGTON

SOFTWARE CONSULTANTS

KENDA SYSTEMS is a progressive software services organization providing engineering consultants on a contractual basis to the East Coast high tech community.

Talented engineers who have confidence in their ability and take pride in their work are welcome to participate in our national expansion by registering with KENDA SYSTEMS.

Forward resume to D. Sierra.

2 Manor Parkway
Salem, NH 03079
603/898-7884

NETWORK SYSTEMS PROGRAMMER

Affiliated Banks Service Company a leader in bank data processing, located in Denver, CO, has an immediate opening for a VTAM/NCP Systems Programmer on IBM software. Qualified candidate should possess the following:

- Prior CNM experience
- SNA/SDLC/BSC/NCP GENS Experience
- Network performance management
- CICS systems or NET/MASTER experience a plus
- MVS operating system experience

We are actively reconfiguring our network to take advantage of new technologies, such as Data with voice, T1, multiplexing, EDI, etc.

We offer a competitive salary and benefits package that includes 3 weeks of vacation, profit sharing, incentive savings, health, life insurance, LTD and training opportunities, and relocation for the qualified candidate. If you are a career minded individual and meet the above qualifications, then give your career a challenging opportunity by sending your resume and salary history to: Affiliated Banks Service Company, 445 E. 124th Avenue, Thornton, CO 80241.

Affiliated Banks Service Company

Equal Opportunity Employer M/F

DIRECTOR, MANAGEMENT TECHNOLOGY DEPT.

The Macomb Intermediate School District is seeking a replacement for the recently retired Director of its Management Technology Department. The Management Technology Dept. is responsible for mainframe and PC based computerized information and financial systems used by districts' staff and other organizations' staff it serves.

The Director reports to the Assistant Superintendent for technology and media services. Responsibilities of the Director include department administration, budget preparation and monitoring, strategic planning, personnel selection and development, and routine re-evaluation of services and resources.

A candidate must have a Bachelor's Degree in Computer Science or an equivalent related degree, 10 years experience with hands-on involvement in programming language, operating systems, IBM mainframe and PC hardware and software, peripherals and data communications. The position requires at least three years experience in managing staff and resources in a mainframe service center environment.

The Macomb Intermediate School District offers a competitive salary and an excellent fringe benefit package.

If interested please send letter of application and a current resume by October 16, 1987 to:

B. Rickman, Deputy Supt.
Macomb Intermediate School District
44001 Garfield Rd
Mt. Clemens, MI 48044

Equal Opportunity Employer

PROGRAMMER/ANALYSTS

Colorado

A Dun & Bradstreet company, located at the foot of the Rocky Mountains, has immediate openings for Programmer/Analysts. This company, at the leading edge of technology, has a full-service Information Systems department utilizing the following:

● IBM 3090	● NOMAD	● PL1
● MVS/XA	● TSO	● COBOL
● DL1	● ROSCOE	● BAL, C
● DB2/SQL	● CICS	● IBM PS/2

The current positions require 1 to 4 years experience in either BAL or PL1. Additional qualifications include strong analysis, problem-solving, and communication skills. Experience in hardware and software listed above is a plus.

Excellent benefit package and salary commensurate with experience. Individuals interested in applying should forward resumes with salary history and requirements to:

NEODATA SERVICES
Human Resources Department
P.O. Box 4586, Boulder, CO. 80306

EOE M/F/H/V

PROJECT MANAGER - Design and implement computer system for client users. Supervise project teams of up to 15 computer support specialists. Require Bachelor's Degree or equivalent in Computer Science, Data Processing or related field (9 months responsible experience = 1 year education) and three years experience. Must have prior supervisory as well as previous experience with GLOSS-3000 systems and HP-3000 and ICL-2900 software. Salary $41,700/annum. Job site/interview: Riverside, CA. Send this ad and resume to Job #MD9708, P.O. Box 9560, Sacramento, CA 95823-0560 no later than 10/13.

Programmer/Analyst: Investigate, design and evaluate systems for administration records, admissions, accounts receivable, and student loans. Design and maintain data bases and on-line systems by utilizing such system utilities as IMAGE/QUERY, QUIZ, VPLUS, on HP3000. Work with the Data Processing Manager to develop and design standard and procedures for programming for use by the programming employees. Must have a Bachelor's Degree in Computer Science plus 2 years exp. in the job offered or 2 years exp. as a Programmer/Analyst. The 2 years exp. as Programmer/Analyst must include exp. in the investigation, design, and evaluation of administration system, financial system, and accounting system. $26,000/ year, 40 hours/wk. 8am-5pm. Send resume with Social Security # to: Indiana State Employment & Training Services, 10 N. Senate Ave, Indianapolis, IN 46204, Attn: W.F. Shepherd, I.D. 3095818

$ EARN 20-35% MORE $
PROGRAMMER/ANALYSTS

- DB2/IMS
- IDMS ADS/O
- ADR IDEAL
- ADABAS NATURAL
- MSA
- MEDIPAC/CLINIPAC
- MAPICS
- ACP/TPF

CW INTERNATIONAL, INC.
3825 HENDERSON BLVD.
SUITE 501
TAMPA, FLORIDA 33629
(813) 874-2296

SOFTWARE PROGRAMMER/ANALYST

Develop, analyze, debug and write software programs and system techniques for use in business information systems, according to customer specifications and requirements. BS with 2 years of experience in job offered or MS in lieu of experience. Degree in Computer Science, or Information Systems or equivalent. $3,050/month. 40 hrs/wk. Job site/interview in El Cerrito, CA. Please enclose ad with resume and reply to: Powersource Computer Systems, Inc., 10020 San Pablo Avenue, El Cerrito, CA 94530. Attn: Personnel.

Systems Analyst - Plan, sched, direct prep pgrms to process bus. data/solve pblms. Clarify pgrms intent, suggest change, design/set up pgrms. 1 yr exp 9-5PM $673.08 wk 40 hrs. Bachelor/Engineering. Computer Horizons Corp. 4 Century Dr, Parsippany, N.J. (201) 539-7800 Ms. Ennis.

CONSULTING

COMSYS, INC. is the leading computer consulting company based in the DC area. If you are a professional with experience in any of the following areas, we may have a project for you working at one of our Fortune 1000 customers' sites.

APPLICATIONS
- VM/CMS, REXX, EXECs
- DATABASE DEVELOPMENT: MODEL204, dBASE, IDMS FOCUS, ORACLE, DMS1100 REVELATION, DB2
- Trusted Computer Base
- TANDEM: TAL, COBOL, SCOBOL, PATHWAY
- SAS, COBOL
- VAX, VMS
- HOSPITAL SYSTEMS: MUMPS, PCS/ADS
- NASA Space Station Disciplines

ENGINEERING
- ELECTRICAL ENGRS: Analog, Digital, PCB
- MECHANICAL ENGRS: E/M PACKAGING
- CAD SYSTEMS: CADDS, VALID
- BIT-SLICE MICROCODING TEST SYSTEMS & STANDARDS: TEMPEST, DOD
- SIMULATION SYSTEMS

SYSTEMS/INTERNALS
- PC/DOS
- C/UNIX
- GCOS/GMAP
- VM/CMS, DOS VSE, MVS

COMMUNICATIONS
- PARS
- WWMCCS
- NETWORK DESIGN
- X.25, SNA, SDLC, HDLC

BALTIMORE AREA
- IDMS
- MODEL 204
- IMS DB/DC
- UNIX/C
- TANDEM, TAL, COBOL
- COBOL, CICS

OTHER POSITIONS
- QA/VERIFICATION & VALIDATION
- Transaction Processing Facilities
- Facilities Manager, IBM Systems
- FEASIBILITY STUDIES
- PROPOSAL/TECHNICAL WRITERS & EDITORS

Some positions will require background checks.

Permanent positions are also available.

Please call or send your resume to us:

COMSYS INC.
computer project support

Attn: CW, 4 Research Pl., Suite 100, Rockville, MD 20850
(301) 921-8866

Software Professionals

Everyone talks innovation. At GE we create it.

Small miracles on a grand scale...

GE Consulting Services is a recognized leader in software consulting, as a developer of technology, as a developer of solutions for complex business environments.

for the systems professional with growth on your mind...

We now offer career opportunities to qualified Analysts and Programmers who will design, code, test, maintain and enhance application systems for our clients. All positions require the ability to adapt to new environments and 2 years experience in one of the following areas:

- **PL/1, COBOL, IMS DB/DC**
- **IDMS, ADS/O**
- **UNIX* "C", INFORMIX**
- **DB2, SQL, TERRADATA**
- **FOCUS, RAMIS**
- **MODEL 204, ORACLE**

in an atmosphere of rewarding discovery.

At GE, the serious technical professional will discover an environment uniquely conducive to both personal and professional growth.

Respect for creative solutions, personalized recognition, an environment of thorough professionalism, superior salaries and comprehensive benefits are among our many incentives. To explore your potential, please send resume with salary history to:

GE Consulting Services
Employee Relations, Dept. CW928
851 Trafalgar Court, Suite 230
Maitland, FL 32751.

The Future is working at GE

Offices in: Arizona, California, Colorado, District of Columbia, Florida, Georgia, Illinois, Kansas, Kentucky, Maryland, Massachusetts, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Texas, Wisconsin

An Equal Opportunity Employer

**UNIX is a trademark of AT&T Bell Laboratories.*

APPLICATIONS

SYSTEMS ANALYST

Southeastern Arizona location. Work with users to define needs and translate to working systems in areas of Student Accounting, Financial Accounting and/or Personnel/Payroll. Requires any combination of eight years experience and college level education in areas related to data processing and systems analysis. Knowledge of COBOL-74, data base experience and experience with UNISYS A3 hardware desirable. Salary $20,064 to $23,958. Libral fringe benefits and vacation. Submit resume, transcripts and three letters of reference no later than Oct. 26, 1987, to: Personnel Office, Cochise College, Douglas, AZ 85607. E.O.E.M/F

SYSTEMS ENGINEERS

A small, growing company has immediate opportunities for software development activities in the Pheonix, AZ and Washington, DC areas. The projects require systems engineering experience (minimum 2 years) in one of the following disciplines:

GCOS8 (PL6 or GMAP)
DNS or GCOS8/DSA (TR6)
GCOS6
SNA (VTAM, NCP or CICS)

Comparable experience will also be considered. Principals only. Salary negotiable. Send resumes to:

Systems Consultants Services Inc.
PO Box 41099
Pheonix, AZ 85080

Programmers

Discover a new degree of satisfaction with your work and your lifestyle at Unisys, Salt Lake City. Living in the heart of the Rocky Mountains, close to the majestic western deserts, you'll breathe a fresher air. The outdoor recreation is exhilarating. The variety of cultural activities is stimulating and rewarding. There's a world of difference for you to explore at Unisys.

UNIX* (Languages)

- Positions require UNIX* background. UNIX* V internals would be a plus. Must also have experience in compiler development, compiler support or software product porting in the UNIX* V environment. Also requires software quality assurance experience for UNIX*-based software products.
- Positions require 2-3 years RPG experience for System 34/36. UNIX* experience and other languages considered a plus.

UNIX* (Operating Systems)

Positions require strong background in UNIX* operating systems, and "C" language is necessary. Product development experience is desirable. UNIX* internals experience is also helpful.

UNIX* (Data Communications)

Positions require background in UNIX* and "C" and a knowledge of device drivers. Must have experience in one or more of the following areas: async/sync host communications (e.g. IBM, Sperry, Burroughs); LAN's, Wide Area Networks (PDN/ DDN) including protocols such as T2.4, TCP/IP, or ISO/OSI standards.

UNIX* (Relational Database)

Positions require 1 to 3 years experience with Relational Database management software running under the UNIX* operating system (e.g. Oracle, Ingres, Unify, or Informex).

Secure UNIX*

Senior and intermediate programmers are required for challenging positions in the implementation and productization of secure UNIX* systems. Working knowledge of UNIX* internals and the DoD "Orange Book" Trusted Computing Base (TCB) is required. Implementation experience with a secure operating system is highly desirable.

Communications

Positions require BS/MS Computer Science or equivalent education, training and/or experience for communications and network software/ microcode development on DCP/Telcon system. Languages include assembler and PASCAL on DCP and/or 68000 microprocessor. Experience with TCP/IP protocols and LAN interface desirable.

For consideration, send your resume in confidence, indicating your area of interest to: **UNISYS Corporation, Attn: Ms. Lynne Tibolla, Employment Dept. 1a, Bldg. C, 322 North 2200 West, Salt Lake City, Utah 84116.**

Equal Opportunity Employer
*Trademark of AT&T BELL LABS

UNISYS

BROADWAY & SEYMOUR, INC., a nationally recognized Charlotte, N.C. based software consulting company, has openings for **PROGRAMMER ANALYSTS** in the following areas:

- **Familiar with VSAM, COBOL and one of the following data bases: IDMS, DB2, ADABAS or DL/1. Must be able to travel.**
- **IBM mainframe, VM/CMS, COBOL and at least 2 years experience in NOMAD or FOCUS.**
- **IBM mainframe 4700 banking experience, COBOL and FCL experience.**

We offer competitive salaries and a comprehensive benefits package that includes medical, dental, long-term disability and life insurance. For consideration, please call or mail your resume to:

Fred Brillante
BROADWAY & SEYMOUR, INC.
302 S. Tryon Street
Charlotte, N.C. 28202
(704) 375-4700
An Equal Opportunity Employer M/F

MANAGER
Technical Services & Operations
$46,599 - $65,229

Information Systems Division of NJ Judiciary is actively seeking a qualified individual to provide technical support and manage daily operations of the Technical Services & Operations Unit. This includes direct supervision and administration of the areas of teleprocessing and network communications, computer operations, systems programming, problem/change and resource management. Responsibilities include assigning, reviewing, evaluating and scheduling work priorities of technical personnel. Provides support and advice to the Division of technical matters and the resolution of operational, systems and/or telecommunications problems. Is responsible for the procurement and maintenance of data processing equipment, software and supplies. Takes appropriate measures to ensure software and data center security.

REQUIREMENTS: Bachelor's degree and 6 years programming and systems experience, 3 years of which shall have been in systems programming, telecommunications, computer equipment evaluation and systems configuration; and 2 years in the management and supervision of related technical personnel. Familiarity with IBM mainframe and smaller systems is helpful as is knowledge of CICS, MVS/XA, DL1, VSAM, VTAM, IDMS/R, Assembler, TSO and COBOL. Master's degree in computer science may be substituted for 1 year of the above mentioned non-supervisory experience. Applicants who do not possess the required education may substitute experience as indicated on a year for year basis.

Individual selected will have the opportunity to work in our rapidly developing Data Center utilizing IBM 3081, MVS/XA, and IDMS/R. This position is located in Trenton, NJ, is non-civil service, offers excellent benefits and a professional modern work environment.

If you have the credentials to make a positive contribution to our dynamic team of professionals, forward resume including salary history by October 9, 1987 to: Natalie P. Smith (MTSO), Judiciary Personnel Office, Richard J. Hughes Justice Complex, CN 985, Trenton, NJ 08625. The Judiciary of NJ is an equal opportunity/affirmative action employer.

M.I.S. Management

As a result of upgrading our technology and converting to an IBM 3090 MVS/XA system we have entered into a significant expansion program. This includes embarking on a major systems development program with DB2 relational data base.

The key position is Director - Management Systems & Communications. In addition other opportunities are developing in Applications & Office Systems.

Director - Management Systems & Communications

Responsible for company-wide Voice/Data Communications, Data Management, Office Systems, Connectivity, End User Computing, and Systems Integration. Design and implement systems that will enhance the company's productivity, efficiency, and decision-making. Knowledge of Large-Scale & Distributed Processors, PBX/CBX systems, Voice Messaging, TI Carriers, SNA/SDLC/LU6.2, and Value Added Carriers. Requires experience in Data Retrieval Tools & Facilities, 4GL's, Data Base Management Systems, Relational Architectures, Data/Enterprise Modeling, and Statistics. A sound business background, appropriate education, relevant technical expertise is mandatory.

Application Development & Office Systems

Other challenging positions are available at all levels- including Project Leaders and Sr. Programmer Analysts - in our Systems Development function, and we will be searching for qualified personnel in the areas of Office Systems, PC Networks, End User Computing, and Management Systems Business Analysts.

These are unique career opportunities to join the world's largest winery in responsible growth positions offering an excellent compensation/benefit package. Work in central California's beautiful San Joaquin Valley and enjoy affordable housing and ideal living conditions away from urban congestion. We are located 90 miles from San Francisco and less than an hour from the foothills of the Sierra Nevada Mountains. Send resume and salary history in complete confidence to: **Professional Staffing Department, CW-9/27, E. & J. Gallo Winery, P.O. Box 1130, Modesto, CA. 95353.**

E. & J. GALLO WINERY

An equal opportunity employer m/f/h.

COMPUTER PROFESSIONALS

A growing nationwide financial services firm has a number of positions available in the following fields:

Site Support. A four year degree in Data Processing is required for this entry level position which will evolve into programming. Good oral and written communications skills are a must.

Programmer/Analyst. Three to five years of COBOL programming experience on IBM mainframes and a four year degree in Data Processing is required. Knowledge of Data Bases and communications is beneficial.

Technical Support. Five years of systems programming experience on IBM mainframes is required. Must have knowledge of the internal works of some of the following softwares: MVS, DOS/VSE, CICS AND VM. DBMS experience would be beneficial.

All the above positions will require some travel and possible relocation to Lansing, Michigan, Chicago, Illinois or Washington D.C. We offer opportunities for growth as well as a competitive compensation and benefits package. For confidential consideration, send resume and salary requirements to:

Assistant Vice-President
Data Processing
P.O. Box 1225
Elk Grove Village, IL 60007

Personal & Confidential

An equal opportunity employer

Systems Analyst/Project Manager; 40 hrs/wk; 8 am-5 pm; $22.00/hr.; Overtime as needed; 1½ for overtime.
Job requires Bachelors degree with major field of study Electrical Engineering or Computer Science and 4 yrs. experience as Systems Analyst. Job also reqs.: 1) Exp. must include 1 yr. exp. as a project leader/manager; 2) Exp. must include 4 yrs. exp. using COBOL, CList, SPF/ISPF, JCL's and VSAM in an IBM MVS/XA operating system environment; 3) Exp. must include 1 yr. exp. using Easytrieve, Panvalet, & RACF. Reqs. 1), 2) & 3) may be completed simultaneously during the same 4 yr. period. 4) 1 course in Structured Systems Analysis Techniques; & 5) 1 crs. in user training. Job duties: Manage design & implement on-line & batch systems using COBOL, CList & JCL computer languages & VSAM access method in an IBM MVS/XA operating system environment. Debug & develop programs using software utilities including Easytrieve, Panvalet, & RACF. Provide training & technical support to users. Write user guidelines & system documentation. Prepare & review progress reports with users & management. Develop system-related proposals including relevant cost information, man hours required, other resources & present such proposals effectively to management.
Applicants should send resume & verification of regs. to: 7310 Woodward, Rm 415, Detroit, MI 48202. Ref. #51687. Employer Pd. Ad.

Research Staff Member – Conduct research in areas of Algorithms & Complexity in context of Multipipeline & Multiprocessor Scheduling Problems. Involves math modeling of precedence-constrained & deterministic scheduling problems. Subsequent to modeling phase, necessary to design provably efficient algorithms & understand complexity of these problems. Involves related wk in areas of parallel algorithms &/or VLSI theory. Requires strng theoretical analysis of precedence-constrained scheduling problems related to pipelined multi-processor systems w/multifunctional pipelines; & theoretical explanations of complexities of these scheduling problems, & algorithms for solving new classes of scheduling problems. Utilize exp in parallel & pipelined architectures. Related exp in one of following two related areas of Theoretical Comp Eng or Comp Sci namely design & analysis of synchronous parallel algorithms, or VLSI, req'd. Must have effectively communicated wk to scientific community in all aforestated areas, both thru conference presentations as well as pubs in journals & tech reports. Req's PhD in Comp Eng/Comp Sci plus 1 yr in job offered or 1 yr ranch in scheduling algorithms. (Rerch exp may be obtained at grad or post-doc level). 40 hr/wk; 8:30am-5:12pm; $58,693/yr; position loc in Westchester Cnty; E.O.E. Send resume or letter only, in duplicate describing qualifications to: R&I #28, Room 501, One Main St., Brooklyn, NY 11201.

Staff Systems Analyst: Resp. for developing inventory control systems in a multi-plant manufacturing environment; integrate marketing back log/forecast software with production control software on IBM System 38 and 4300 mainframes; convert System 38 data, applications software and database software to IBM System 4300 mainframe; resp. for networking communications between PC's System 38, and remote System 4300. Req: B.S. in Computer Science or equiv. in Computer Science OR no degree & 5 yrs. experience in Computer Science. Also includes in-depth exp. (5 years) with Systems 38 and 4300, including operating systems (VM and MVS), applications software (MAPICS), database software (IMS DB/DC), and programming languages (RPG III, Cobol); and in-depth (5 yrs.) communications and project management exp. (exp. may be gained concurrently). Salary: $50,000/yr. Job Site: Milpitas, CA. Send this ad and a resume to: Job #SK 8648, P.O. Box 9580, Sacramento, CA 95823-0580, no later than 10/13/87.

CONTRACT PROGRAMMERS
TPF/ACP APPLICATIONS PROGRAMMERS
X.25 SNA CICS TANDEM IMS DL/1 Professionals

IMMEDIATE NEEDS

Top earnings, bonuses and relocation allowances for int'l and domestic assignments. Need 8 programmers with at least 3 years TPF/ACP applications development experience.

Many SF Bay area assignments available. Send resume to:

IPEX
47 Lafayette Circle, Ste. 310
Lafayette, CA 94549

DATABASE ADMINISTRATOR

The Data Administration Department of our multi-national energy services company is seeking a Database Administrator to join our Corporate staff in New Orleans.

Responsibilities include the installation of IDMS maintenance and new releases, moving new programs and databases from test to production, performing physical database design, tuning IDMS central version, and supporting systems development with IDMS tools.

Requirements include a technical college degree, 5-10 years large mainframe (IBM) Programmer/Analyst or Systems Programming experience, and at least 2 years experience as an IDMS DBA/Systems Programmer. (DB2 experience a plus.)

Interested candidates should send a resume including salary history/requirements to: **Missy Breaux, McDERMOTT INCORPORATED, P.O. Box 60035, New Orleans, LA 70160.**

An Equal Opportunity Employer, M/F

McDermott

Where the world comes for energy solutions.

We're looking for more than just your technical abilities.

Sure, we're counting on your top-notch technical talent. But a career with GE Consulting Services utilizes much more than that. Such as your ability to take on the responsibility for troubleshooting at our client sites. We also look to our consultants' individual experiences and expertise to contribute to the overall success of our operation.

As a GE Consultant, you'll have the chance to work at a variety of client locations on a range of different projects. We can also offer you the opportunity to stay on the leading edge of technology through in-house training programs and continuing education. Right now, we're seeking dedicated problem-solvers to function as Programmers and Programmer Analysts experienced in:

- **DB2**
- **ADR/IDEAL**
- **IMS DB/DC**
- **Adabas/Natural**

You should have a college degree, preferably in Computer Science, and 3+ years applications development experience. You should also have the desire to take on the challenges our projects demand and contribute to the overall success of our business as well as the excellent interpersonal skills necessary to inspire confidence and trust with people at all levels.

If you have the above abilities, then we'll reward you with an excellent salary and benefits package you'd expect from a major force in the consulting industry. We can offer you a full-time position with the pride and satisfaction that comes with a career in professional consulting.

Sound like something you'd like to become a part of? Send your résumé in complete confidence to: **Mr. Jack Falloure, GE Consulting Services, 15301 Dallas Parkway, Suite 720-LB 51, Dallas, TX 75248.** We are an equal opportunity employer.

We Bring Solutions To Life.

GE CONSULTING SERVICES

General Electric Consulting Services Corporation

NJECN

EDP Management Opportunities

The New Jersey Educational Computer Network, Inc., (NJECN) is a private organization providing machine, technical, consulting and management computing and communication services to educational, government and commercial clients. Due to substantial expansion in business, we currently have long-term career opportunities for highly motivated, results-oriented professionals to complement our present staff.

VICE PRESIDENT OF FINANCE & ADMINISTRATION

Five years of experience in corporate financial administration. Knowledge of computers is desirable in terms of their associated costs, functions and applications. Skills in short- and long-range planning as well as in financial control of cash flow. Divisional responsibility for fiscal planning and control including corporate budgets, investment of corporate assets, contracts administration, purchasing, insurance and physical facilities. Candidate should possess an MBA degree or the equivalent; CPA also preferred.

DATA CENTER MANAGER/DIRECTOR

Individual with experience in project management/management in Data Center. College and university experience is desirable. Short- and long-term capacity, staff, and product planning experience. Excellent organizational and interpersonal skills is required. Candidate should possess a Bachelor's degree or equivalent experience.

Positions offer a competitive compensation package, including a comprehensive benefits plan. Resumes will be received until the positions are filled. For consideration, submit resume, and detailed, relevant experience, including salary history and current compensation to:

Human Resources - Mgmt
New Jersey Educational Computer Network, Inc.
3900 Park Avenue
Edison, New Jersey 08820

EQUAL EMPLOYMENT OPPORTUNITY, AFFIRMATIVE ACTION EMPLOYER, M/F

COMPUTER CAREERS NETWORK

Now you can recruit the best qualified computer and communications professionals regionally, nationally and weekly.

How?

With IDG Communications new Computer Careers Network. Choose from the Network's eight computer-related newspapers and tailor youre recruitment message to the type of talented professionals you need to reach -- professionals that read Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week, and Computer Currents. Then, target your audience by region. Or blanket the entire nation.

Call your local sales representative today for more information about Computer Careers Network's regional, national and weekly reach.

Sales Offices

John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Al DeMille, Regional Manager, Jay Novack, Account Executive; 800-343-6474. (In Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1390; Jay Novack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3110 Fairview Park Drive, Ste 1040, Falls Church, VA 22042; Katie Krees, Regional Manager, 703-876-5100; Pauline Smith, Account Executive 800-343-6474.

CHICAGO: 2800 South River Road, Ste. 304, DesPlaines, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Cross, Account Exective 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Ste. 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-827-0184; Nancy Percival, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Ste. 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-827-0184; Nancy Percival, Account Executive, 800-343-6474.

Experienced Software Developers

LAI has immediate openings for you using System V and/or 4.3BSD UNIX® operating systems. Our current porting projects involve: super-computer, multi-processor and supermicroprocessor systems. Projects you can contribute to include:

- A UNIX® port to multiprocessor supercomputer class machine;
- System V and 4.3BSD ports to 680x0 based micro-processors;
- 4.3BSD port to a new high speed VLSI processor;
- System V co-existence with a traditional mainframe operating system;
- System V study and port for a major supermini;
- NFS™ Product development for System V, VMS, and other systems end;
- Product development of STREAMS TCP and other protocols.

These positons require 3 years of UNIX/C programming with specific experience in: Kernel programming (System V and/or 4.3BSD), development and/or support of network protocols, and System V STREAMS.

Opportunities also exist for experienced project leaders in these areas.

For consideration, send your resume to:

Lachman Associates, Inc.
1901 N. Naper Boulevard
Naperville, IL 60540-1031
Attn: Staffing-CW

LAI is an EOE
UNIX is a registered trademark of AT&T
NFS is a trademark of Sun Microsystems

VAX DATA BASE ADMINISTRATOR/ PROGRAMMER ANALYST

Michelin Tire Corporation, the leader in radial tire technology, has an immediate opening for a VAX Data Base Administrator/Programmer Analyst. This position is responsible for discharging the full range of DBA functions for a state-of-the-art relational DBMS on a VAX 8600. In addition, this individual will also develop and implement manufacturing applications in COBOL and/or FORTRAN.

This individual should have a B.S. degree in Math, Engineering or Computer Science and 3+ years of application development experience (analysis and programming) using COBOL and/or FORTRAN in a manufacturing environment. Experience as a Data Base Analyst/Administrator, and experience with Cincom's ULTRA DBMS and MRP-II would be an asset.

Michelin offers employees a comprehensive benefit program including major medical and dental coverage, long and short-term disability, life insurance, AD&D, educational benefits, vacation and holiday plans, a company-paid retirement plan and much more. For consideration, send your resume and salary history to:
F. Yelverton, Dept. SPT-VO4,
Michelin Tire Corporation,
P.O. Box 2846, Greenville, SC 29602.
An Equal Opportunity Employer.

MICHELIN®
PUTTING CAREERS IN MOTION.

INSURANCE DATA PROCESSING

Nationwide openings for programmers, analysts and managers. Life, health, or property & casualty insurance. Experience with LifeComm, Life 70, PALM, PMS, Cybertech, ALIS or CFO preferred. All positions fee-paid.

O'Keefe & ASSOCIATES
4005 Spicewood Springs Rd., Ste. A-100
Austin, TX 78759 • (512) 343-1134

Director of Computing Services Whittier College

The Director manages Whittier College's new computer center facility (which includes a PDP 1160 and HP3000) and its microcomputer centers (IBM and Macintosh), oversees all aspects of academic and administrative computing, and manages computer center personnel. Reporting to the Vice President for Academic Affairs, the Director of Computing Services will anticipate computing needs, promote computer use on campus, and identify outside sources of support for expanding computing capabilities. The ideal candidate will have 2-3 years experience in a collegiate computing environment and be able to work well with various constituencies; present or former faculty who have moved into computing management are especially encouraged to apply. EOE/AA. Screening of applications will begin October 1, and will continue until the position is filled. Please send letter of application, resume, and names of three references to: Dr. Robert B. Marks, Vice President for Academic Affairs, Whittier College, Whittier, CA 90608.

PROGRAMMERS ANALYSTS CONSULTANTS

HARDWARE
COMMUNICATIONS
DBMS
APPLICATIONS
SOFTWARE
SYSTEMHOUSE INC.
INTEGRATED
SYSTEMS

Systemhouse Inc., one of North America's leading systems integration and computer services companies with 1300 professionals and annual revenues in excess of $150 million, is creating custom computer based solutions to private and government client organizations. Our continued success in delivering custom solutions has created career opportunities within our National Systems Branch.

The self-motivated professionals we seek will have a minimum of 1 year of experience in a large systems environment with knowledge of one or more of the following:

COBOL CICS ADABAS
NATURAL TMF ENSCRIBE
PATHWAY

RELOCATION AND TRAVEL REQUIRED FOR ALL POSITIONS LISTED.

Current assignments are in South Carolina, Utah, Kansas, Arizona and Alaska.

We offer a highly competitive compensation package including an extensive benefits plan. For immediate consideration, please forward your résumé in confidence to:

Systemhouse Inc.
National Systems
Dept CW-928
1010 North Glebe Road, 2nd Floor
Arlington, VA 22201
ATTN: Beth Jenkins
Manager of Human Resources
(703) 276-0500

An Equal Opportunity Employer.

Systemhouse Inc.

We understand life's highest priorities.

At CompuSearch, we realize matching the right person to the right position involves more than cold numbers and plain facts.

It involves families. And feelings. Because a new career can have a major impact on you and those you care about.

So when it's time for you to consider a new employment opportunity, call CompuSearch. Our experience as the leader in data processing recruitment can pay off for you in many ways.

We know where the opportunities are in the industry. And we never lose track of life's highest priorities. That's why our candidates are able to achieve both personal and professional satisfaction.

Contact Marc Blessing, National CompuSearch Director, for the office nearest you. 1-800-321-2309. In Ohio call: (216) 696-1122.

CompuSearch®
A DIVISION OF MANAGEMENT RECRUITERS

Experienced Programmer/Analysts

CALL US...

We'll Help You Grow

M.I.S. International is one of Michigan's largest consulting firms. For over 16 years, our data processing and engineering professionals have provided services to Fortune 500 firms including the major automobile manufacturers and suppliers.

We are enjoying exceptional growth in both our Michigan and Atlanta Divisions making this a perfect time to step up to a permanent position on our technical staff. We're interested in Programmer/Analysts with at least one year of experience in the following:

- IMS DB/DC, COBOL
- DB2
- CICS, COBOL
- DATA CTR. MGR., OS/MVS, Bank Bkgd.
- C, UNIX, Business Bkgd.
- IDMS or IDMS-R with ADS/O
- VAX/VMS, FORTRAN

For more information contact: **Marie Clark, Director of National Recruiting at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 23380 Commerce Drive, Farmington Hills, MI 48024.**

MIS INTERNATIONAL INC.

Farmington Hills • Atlanta • Ft. Lauderdale

Equal Opportunity Employer

MANAGING ENGINEER/HARDWARE DEVELOPMENT to direct all engineering aspects of integrating 2 distinct lines of mainframe and personal computers, including modification of existing models and systems to promote current compatibility. Manage Original Equipment Manufacture (OEM) printer development schedules, development of engineering evaluation of out-sourced printer products, recommending policies and procedures governing the evaluation of new printer products and the training of staff in such policies to govern new product evaluation and testing. Will have daily direction of development, modification and integration of systems utilizing MS-DOS, BTOS, Unix compatible printer systems, mainframes, personal computers, print, optical character and bar code reading systems and test equipment. MSci in Electrical Engineering +3 years in job or 3 years as Systems Design Engineer required. Previous experience must include 2 years hands on experience developing & utilizing MS-DOS, BTOS, Unix compatible printer systems, mainframes, personal computers, print, optical character, and bar code reading systems and test equipment. 40 hours per week. M-F. 8 am-4:30 pm. $50,851 per year. Send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Ref. No. 48487. Employer Paid Ad.

Position Available for Control Systems Programmer/Analyst. The position requires the individual to exercise independent judgement in developing computer programs for administration of existing and new client accounts/files/production systems including contributi'', earnings, forfeitures, registers, statements, and other programs necessary to accommodate customer requirements, changes in legal documentation formats and government regulations. Research new software methods and usages in field. Two years experience required. B.S. degrees in Computer Science and either Business Administration, Banking or Finance are also required. Masters Degree in Computer Science will substitute for two years required experience. 40 hours per week, Monday through Friday, 8:00 A.M. til 5:00 P.M. Salary of $1,735.00 per month. Equal Opportunity Employer. Contact Oklahoma State Employment Service, Job Order #090915, 8720 S.E. 15th, Midwest City, Oklahoma 73110.

Computer software and hardware specialist required to set up computer system; program computer; repair and service computers and all peripheral equipment and other electronic equipment used by our company. Must have BA in Computer Science; 1 year training in electronic servicing, with diploma, and 1 year experience as an electronic servicing technician. 40 hours per week. 9 a.m. to 5 p.m., $520.35 per week. Employer paid ad. Send resumes to: 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #32487.

PROGRAMMER ANALYST FINANCIAL SYSTEMS

Our client, a major hardware vendor, requires software support for the installation and customization of their financial systems. Currently we have several positions available in the eastern segment of the country. These positions require experience with Unisys hardware and one or more of the following software packages; Item Processing System (IPS), Financial Systems Architecture (FSA), Global Financial Systems (GFS).

We offer a competitive salary, bonus opportunities and are willing to discuss relocation expenses. Additional opportunities are anticipated in other areas of the country in the very near future. Send your resume to:

MTB Computer Consulting Corp.
170 Broadway, Suite 201
New York, NY 10038

ONLINE & DATABASE
ATLANTA & SOUTHEAST
$25,000 to $60,000

Need Programmers, Programmer Analysts for Full Time and Consulting Positions in IBM Shops. Relocation & Expenses Paid.

Send resume to:
Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road
Suite 202
Marietta, Georgia 30062
404-971-7281

PROGRAMMER ANALYST

Growing computer services company seeks a programmer analyst with a minimum of 2 years experience and a senior programmer analyst with a minimum of 5 years experience. Both preferably with DEC experience.
Involvement with all stages of the software development process, from generating ideas through training users.
Develop your career at an exciting company where you can make an impact. Excellent starting salary commensurate with experience.

Send resume to:

1632 Enterprise Parkway
Unit C
Twinsburg, OH 44087
Attn: Kineta

Data Base Administrator

Southeastern electric utility seeks a Data Base Administrator to direct, design, and coordinate IMS DB/DC and other data base systems and facilities. Requires a Bachelor's degree in Computer Science, Math, or Business Administration with a minimum of five years related experience, three of which must have been spent performing data base administration functions. Must have experience with ANSI COBOL, VS/JCL, VSAM, and IMS DB/DC in IBM's MVS environment.

Send resume and salary requirements in confidence to:

Allison C. Dennis
Personnel Specialist
Santee Cooper
P.O. Box 398
Moncks Corner, S.C. 29461
(803) 761-4088

An Equal Opportunity Employer

Our product is energy, but our most important resource is people

Santee Cooper

COMPUTER PROFESSIONALS

Highly professional and well established Alaska based computer service and sales company is seeking independent computer professionals for contract opportunities throughout the western US. Minimum 3-5 years experience in a WANG VS, DEC or IBM VM/MVS environment, with proficiency in any of the following skill areas: COBOL, PACE, FOCUS, MARK IV, ORACLE, IDEAL, NATURAL, ADABAS, CICS, IMS DB/DC, IDMS, VTAM, and Project Management.
Send resume stating specific hardware and software experience and three references to:

ComRim International Inc.
560 E. 34th Ave. Suite 200
Anchorage, AK 99503
(907) 563-0304
E.O.E.

PROGRAMMER/ANALYST - (two positions available) - Partake in development of annuity and extensive BATCH COBOL maintenance. Require Bachelor's or equivalent (9 months experience = 1 year education) and 1 year experience including insurance and financial environment with CICS, MVS, TSO/ISPF, VSAM, structured programming and design methodologies. Salary $32,500 per annum. Job location: Los Angeles. Resume to: J.S. Ferrier, Dept. PAII, P.O. Box 92193, Los Angeles, CA 90009.

Database Administrator Clinical Research

Imagine solving DP problems as if lives were in the balance.

How would you like to use your knowledge of advanced software by contributing to the creation of life-saving, life-improving pharmaceuticals? It's possible at Wyeth.

We're a leading pharmaceutical company with a world-wide reputation for Antibiotics. Infant nutritionals. Analgesics. Biologicals. Tranquilizers. Cardiovasculars. Medication delivery systems. And much more.

Here, you'll work in a dual large-scale IBM and Hewlett-Packard computer environment using batch and on-line development techniques. Few companies are as computer-intensive, and few are expanding as rapidly to meet the creative challenges of applying new technology to applications in clinical data processing.

Team up with research scientists and physicians in development of new drugs at our worldwide corporate R&D and administrative headquarters location. You'll analyze, define, and maintain clinical trial databases on our IBM mainframe, install new releases of the DBMS software, monitor database performance and capacity, evaluate complimentary software products, develop SOPs, and administer training programs.

To qualify, you'll need a Bachelor's degree in Computer Science or Mathematics with at least five years of applications development and at least one year of DBA or systems programming experience. Experience in the use and support of relational DBMS systems (preferably Oracle) is essential. You must also possess outstanding communications skills.

Explore your exceptional career advantages with Wyeth including a very competitive salary, extensive company benefits, and a distinctive work environment on our 20-acre Corporate campus located in an attractive suburban community on Philadelphia's prestigious Main Line. Send your resume to: **Position #169, Manager of Recruitment, Wyeth Laboratories, Inc., P.O. Box 8299, Philadelphia, PA 19101.** Equal Opportunity Employer, M/F/H/V responses encouraged.

Wyeth Laboratories, Inc.

TM

COMPUTER CAREERS NETWORK

Now you can reach the qualified computer professionals you're looking for with Computer Careers Network.

Every week, the new IDG Communications Computer Careers Network of eight leading computer and communications newspapers delivers your recruitment advertising to an audience of highly qualified computer and communications professionals. When you put the proven, weekly authority of Computerworld and specialized readerships of InfoWorld, Network World, Digital News, Federal Computer Week, and three regional editions of Computer Currents to work for you, you get the best chance ever to target the qualified professionals you need to reach.

Select the publications you need to reach the talent you're looking for. Then target your audience by region. Or blanket the entire nation.

To put the Computer Careers Network to work for you, call the sales office nearest you today.

Computer Careers Network.

Sales Offices

John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Al DeMille, Regional Manager, Jay Novack, Account Executive; 800-343-6474. (in Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3110 Fairview Park Drive, Ste 1040, Falls Church, VA 22042;
Katie Kress, Regional Manager, 703-876-5100; Pauline Smith, Account Executive
800-343-6474.

CHICAGO: 2600 South River Road, Ste. 304, DesPlaines, IL 60018;
Patricia Powers, Regional Manager, 312-827-4433; Ellen Cross, Account Exective
800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Ste. 100, Irvine, CA 92714;
Barbara Murphy; Regional Manager, 714-827-0164; Nancy Percival, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Ste. 100, Irvine, CA 92714;
Barbara Murphy, Regional Manager, 714-827-0164; Nancy Percival, Account Executive, 800-343-6474.

BUY SELL SWAP

IBM SPECIALISTS

SELL • LEASE • BUY

S/34 3741 S/36 S/38 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670

IN TENNESSEE (615) 847-1011

CMA COMPUTER MARKETING of Nashville, Inc.

P.O. BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

IBM 4300 SYSTEM 38 SYSTEM 36 SERIES 1

MEMBER OF CMA

• SPECIAL New S/36 Models D2K, D2L, D2M & 358 MB Disk Upgrades
• Buy • Sell • Lease • Trade • New • Used
• IBM Warranty/IBM Maintenance Guaranteed
• Disk • Terminals
• Flexible Lease Options Tailored to Your Needs • Printers • Tape
• Equipment Configured To Your Requirements • All CPU Upgrades

MEMBER OF WACL

NEWPORT LEASING, INC.

714/770-2122

2 Faraday, Irvine, CA 92718

BUY DIRECT

34 36 38 4300

SYSTEMS/34 • 36 • 38 4300 • TAPES AND DISKS

BUY, SELL & LEASE COMPLETE IBM SYSTEMS

CPU'S-CRT'S-PRINTERS-UPGRADES-FEATURES & PARTS, ALL MODELS, NEW & USED

Discount Prices — Express Service — IBM Maintenance Guaranteed

A TRULY NATIONAL MARKETPLACE . . .

WHERE ONE TOLL FREE CALL DOES IT ALL!

800-858-1144

COMPUTER MARKETPLACE

205 East 5th St., Corona CA 91719

(714) 735-2102

Member Computer Dealers & Lessors Association

IBM...36, 38, 4300, 30XX

- BUY
- SELL
- LEASE (Short or Long Term)

UPGRADES
PRINTERS
CONTROLLERS
TAPES
DISKS
TERMINALS
FEATURES

CALL TOLL FREE 800 258-2233 IN CALIFORNIA (714) 838-3717

ICS

INTERNATIONAL COMPUTER SALES, INC. • 515 E. 1st ST., SUITE A • TUSTIN, CA 92680

BRAND NAME DISKETTES

49¢ Color 5¼" DSDD Min. 50

29¢ 5¼" DSDD Min. 100 25¢ Min. 50

79¢ 5¼" IBM AT HD Min. 50

2 for 1 Replacement Guarantee
If found initially defective within six months
With sleeves, tabs, labels
For TYVEC sleeves, add 2¢

99¢ 3½" DSDD Min. 25 Subject to availability

$1.09 3½" DSDD Min. 25 Subject to availability

$15.90 Min. 5 3½" 10 MB IBM Cartridge 3M/DS Compatible

$4.29 Box of 10 5¼" DSDD Min. 10 Boxes

$19.20 Min. 5 600' 120 MB Data Cartridge

$5.99 Box of 10 Color 5¼" DSDD Free Plastic Case Min. 5 Boxes

Immediate Shipping — Guaranteed satisfaction
Call for greater discounts on larger orders
100% Lifetime Warranty
Shipping: $3.50 per min. order/$1.50 each addtl. lot
MC/VISA accepted

1-800-537-1600
OPERATOR NO. 38
MICRO ELECTRONIC PRODUCTS

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 1600 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.50 ea.
600' Reel $3.75 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

IBM + APPLE CABLES
PREMIUM QUALITY Cables

FULLY MOLDED GUARENTEED FOR LIFE

6' IBM PC to Printer	$11.90
SWITCH CABLE	$55.00

MINI DIN CONNECTOR
APPLE TALK CABLES
DEALERS WELCOME

COMPUTER HELPERS

305-962-6320 or 305-962-6740

For Sale
XEROX
9700 - 168
w/813,815,822
Eligible for FSMA
Available Now
Call; Chip Seidel
Fortune Leasing INc.
813-785-2500

DEC

BUY · SELL
TRADE · LEASE
NEW/USED
SYSTEMS PERIPHERALS

Time Electronics, Inc.

MA: 617-342-4210
OH: 614-764-2224

DEC is a Registered Trademark of Digital Equipment Corp

NEED MORE MIPS?

Call 800-243-5307

SEPTEMBER, 1987

Copyright 1987 Randolph Computer Corporation

IBM SYSTEMS	MIPS	MEGABYTES (Millions of Instructions Processed Per Second)
•9373-20	0.5	4 to 16
•9375-40	0.5	8 to 16
4331-2	0.5	1 to 4
S/38-300	0.58	6 to 8
S/38-400	0.75	6 to 8
4341-1	0.89	2 to 4
S/38-600	0.98	8 to 16
S/38-700	1.1	16 to 32
•9375-60	1.2	8 to 16
4381-11	1.4	4 to 16
4361-5	1.45	2 to 16
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
†4381-21	1.9	8 to 16
4381-1	2.1	4 to 16
•9377-90	2.5	8 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.2	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
†4381-23	4.7	16 to 64

IBM SYSTEMS	MIPS	MEGABYTES (Millions of Instructions Processed Per Second)
3033-UP	5.0	4 to 24
4381-14	6.5	16 to 32
3083EX	6.6	8 to 32
•3090-120E	7.5	16 to 128
†4381-24	7.8	16 to 64
3083JX	8.8	8 to 32
3090-150	9.2	32 to 64
3081D	10.8	16 to 32
•3090-150E	10.0	32 to 64
3081 GX	13.9	16 to 64
3090-180	13.4	32 to 64
3081KX	16.6	16 to 64
•3090-180E	17.8	32 to 64
3090-200	17.7	64 to 128
3081KX	26.7	32 to 128
•3090-200E	31.9	64 to 128
•3090-300E	44.3	64 to 128
3090-400	50.0	128 to 256
•3090-400E	56.0	128 to 256
•3090-600E	76.0	128 to 256

• First Installation 1987
† First Installation 1st Qtr 1988

AMDAHL SYSTEMS	MIPS	MEGABYTES
5840	8.4	16 to 128
5850	11.8	16 to 128
5860	14.5	32 to 128
5867	22.0	24 to 128
5868	22.0	32 to 256
5870	36.6	32 to 128
5880	55.5	32 to 256
•5890-190E	22	64 to 256
•5890-200E	31	64 to 256
•5890-300E	40	64 to 256
•5890-400E	58	128 to 512
•5890-600E	67	128 to 512

NATIONAL ADVANCED SYSTEMS	MIPS	MEGABYTES
AS 9060	11	16 to 64
ASXL-50	15	32 to 64
AS 9070	16	16 to 64
AS 9080	20	16 to 64
AS XL-60	28	64 to 256
AS XL-80	50	64 to 256
•AS XL-90	67	128 to 512
•AS XL-100	80	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations and system manufacturers continually modify computer models as design improvements in hardware and software arise.

TALK TO RANDOLPH NOW. Whatever your computer system needs, Randolph can deliver the hardware when you need it . . . and ease the pressure on your DP budget with low lease rates. Call 800-243-5307, in CT (203) 661-4200.

Randolph

Randolph Computer Corporation
Subsidiary of Bank of Boston • 537 Steamboat Road, Greenwich, CT 06830

1-800-426-USED

In California (714) 641-0366

IF IBM MAKES IT, WE CAN SAVE YOU MONEY

Series/1
System/34
System/36
System/38
43XX
30XX

- *Top Savings*
- *Quick Delivery*
- *Short and Long-Term Leases*
- *All Models & Peripherals*
- *New & Used*

M|A

Marshall Lewis
& Associates, Inc.

Member Computer Dealers & Lessors Association

1536 Brookhollow Drive, Building A
Santa Ana, Ca 92705-5426

★ Buy ★ Sell ★ Lease ★ Rent

IBM. PC's

5150 — 5160 — 5170 — 5171

IBM. Displaywriters

5525 — OFFICE SYSTEMS
5219 — 5253 — 5258

6670 PRINTERS

SYSTEM/34/36

CDB FINANCIAL, INC.
3520 DILIDO ROAD
DALLAS, TEXAS 75228
800-648-6791
214-324-3491

SOUTHERN DATA SYSTEMS
2712 Landers Ave. Nashville, TN 37211
(615) 244-3012

. . . where quality service is a technical tradition

SYSTEM 34 36 38
All Related I/O

MAINFRAME I/O
Terminals Printers
DASD Controllers

5/23 DATAMASTER
PC/XT/AT 5110/5120
DISPLAYWRITER

(Call Us Toll Free, Today!)
800-251-2614

IF YOU'RE BUYING, WE'RE SELLING.
36
38
4300
IF YOU'RE SELLING, WE'RE BUYING.
IBM SYSTEMS Buy • Sell • Lease PERIPHERALS
(800) 331-8283
TOLL FREE
(213) 306-9343
CALIFORNIA
Ocean Computers, Inc.
8055 W. Manchester Ave., Ste 525
Playa Del Rey, CA 90293

FOR SALE

Seven (7) Racal-Milgo MPS48 4800bps modems. $400 each.

Available immediately.

Contact:
Denny Fisher
515/283-7100

REAL ESTATE

PRESTIGE FACILITY

Prime first floor office space with clean, efficient work or laboratory area. This 6,000 sf is ideal for high-tech start-up or professional services business.

Beautifully landscaped building is located in Hopkinton at exit 21, Rt. 495, 3 miles from Mass Pike interchange and 45 minutes from Boston.

Facility is 100% air-conditioned and has fully carpeted office area, private mens and womens restrooms and small kitchen.

Immediately available on sublet through April 1990 with long term option.

For further details or to arrange personal inspection, please call 435-5363.

BUSINESS OPPORTUNITY

THE CORPORATION OF THE CITY OF HAMILTON
REQUEST FOR PROPOSALS
FOR
DATABASE MANAGEMENT SYSTEM SOFTWARE
MIS TOOLKIT SOFTWARE
USER TOOLKIT SOFTWARE

The Corporation of The City of Hamilton (Ontario, Canada) is inviting proposals for the supply of state of the art DATABASE MANAGEMENT SYSTEM SOFTWARE, MIS TOOLKIT SOFTWARE, AND USER TOOLKIT SOFTWARE for the design, development, and implementation of a major computer system.

This RFP is open to both single and multi-product vendors. Vendors may respond to any combination of the three software categories listed above or may respond to any particular section of a category or categories.

Proposal documents are available in the Purchasing Department, City Hall, Hamilton or will be couriered (collect). For additional information, please contact Mr. J.G. Hindson, P.Eng., Manager of Information Systems at (416) 526-4562 or Tom Bradley, Manager of Purchasing at (416) 526-2799.

The proposal must be delivered to Mr. E.A. Simpson, City Clerk, City Hall, 71 Main Street West, Hamilton, Ontario Canada L8N 3T4 before 11:00 o'clock a.m.

Submissions received after this time will not be considered.

REQUEST FOR PROPOSALS

The City of Kansas City, Missouri is seeking proposals from professional consultants who are experienced in the planning and development of interactive graphics mapping information systems. The services required include a feasibility study and the development of a multi-year project plan and schedule for the planning, design and implementation of a phased computerized geographic information system and computer aided drafting/design system for the city. Interested parties should contact:

Stanley J. Harris
Assistant Manager, Streets Division
414 East 12th St.
Kansas City, MO 64106
or phone (816) 274-1684

CLASSIFIED ADVERTISING ORDER FORM

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time, Services & Software, Computer Careers and Buy/Sell/Swap. (Available upon request: Education, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are $176.40 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $352.80 per insertion. Extra space is available in half-inch increments and costs $88.20. Box numbers are $15.00 extra per insertion.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

Ad size desired:
_____ columns wide by_____ inches deep.

Issue Date(s): _____

Section: _____

Name: _____

Company: _____

Address: _____

_____

Telephone: _____

Send this form to:

COMPUTERWORLD CLASSIFIED ADVERTISING
375 Cochituate Road
Box 9171
Framingham, MA 01701-9171
Telecopier extensions:
739 *740*

THE BULLETIN BOARD

IBM

RENT
Mo. to Mo., Immed. Avail.
3178 3191 3174 3268
3179 3278 3274 3287
3180 3279 3276 4224
All Other IBM Units Available
Call Penny 800/426-4381
In CA 408/241-3677
Marketex Computer Corp.

BUY • SELL • SAVE $
IBM DISPLAYWRITERS
34*S, 36*S, 38*S
5525 Systems
5219 Printers, 5253-1 Terminals
LRK RESOURCES UNLTD INC.
CALL LAURIE OR RICK
713-437-7379
800-523-8903

IBM

Sale or Lease
3174 - 1L
8140 - C92
Call Dick or Mike
New York Systems Exchange
(516) 673-3830

Immediately Available
3178
(Equivalent to)
$250 each or Best Offer
Maintenance Available
Call Phil Ingalls
(303) 499-8010

IBM

S/36 S/38
Buy - Sell - Lease
We Pay Cash
for your used equipment
1-800-LEAS-PAK
D/FW Metro: 267-2841

SALE OR LEASE
3178 - C20, C30 & C40
3180 - 100
3274 - 41A & 41D
* Ship from our inventory
* Other types & models also available
Bluebonnet Computer Co.
(512) 926-3900

IBM

SALE/LEASE
9370-MOD 20
BELOW LIST!
Available Now Warranty
Call Tom or Chuck
Ocean Computers
(800) 331-8283 or (213) 306 9343

S/33 S/36 S/34
SERIES 1
BUY - SELL - LEASE
Systems, Peripherals & Upgrades
Source Data Products Inc.
800 Menlo Avenue # 200
Menlo Park, CA 94025
800/328-2669 415/326-7333

IBM

Thanks for the
MEMORY
That's what our 4381, 4381, and 3X customers are saying. We will supply, install and IBM certify any IBM memory upgrade. References available nationwide.
Marketex Computer Corp.
800-426-4381
In CA 408-241-3677

SALE/LEASE
3380-AA4
3380-B4
October/November
Call Bill Hegan
(914) 238-9831
Computer Merchants Inc.

IBM

NEED TO BUY
Small
SYSTEM 36
Distinctive Dataprocessing
214-869-2214

MODEMS
3865-002 with FC 7930, 220 Volts
3868-3 and 3868-4
Many available now!
Data Supplies, Stockholm, Sweden
Tel 46-8-455910, Telex S13539
Fax 46-8-197844

DATA GENERAL

NPA SYSTEMS INC.
SALE, LEASE, & SERVICES OF DG EQUIPMENT
(516) 467-2500 (NY)
(415) 848-9835 (CA)
(214) 349-1692 (TX)
DISASTER PLAN & FACILITY MANAGEMENT ALSO AVAILABLE

DG NEW & USED
BUY - SELL - LEASE
CRT's ● Disk Tops ● Memory Systems ● DICS ● Tapes
HP Laser Jets ● IBM PC's
Ames Sciences, Inc.
(301) 228-9100

HEWLETT PACKARD

S/70 & S/68
Also
HP 2392A Terminals
Qty. Available
Quantity Pricing Available
All in stock - immediate delivery
Subject to prior sale
All warranteed to qualify for manufacturer's maintenance
BUY * SELL * RENT * LEASE
Processors * Peripherals * Systems
From the HP 3000 Experts!
800/643-4954 213/829-2277
ConAm Corporation
It's Performance That Counts!

MISC. SYSTEMS

Going Out Of Business For Sale
ONE YEAR OLD
KRONOS 55 TIMEKEEPING SYSTEM
W/ FOUR TIMECLOCKS
IBM COMPATIBLE AT JR.
W/ EPSON 86e PRINTER
AVAILABLE IN OCTOBER
PLEASE CONTACT
BILL DANIEL (404) 448-4050
WALTHER FURNITURE
5675 JIMMY CARTER BLVD.
NORCROSS, GA 30071

FOR SALE
Used GDC T-1 Multiplexors
(12) Model 1258's
(450) RS232 Sync data cards
(2) Netcon 40's
A/B and T/M Netswitchers
Call: Tom Tosto
(617) 434-5611

MISC.

NEW & USED RAISED FLOORING
Immediate Delivery
Quality Installation
RAISED COMPUTER FLOORS
One Charles Street
Westwood, NJ 07675
(201) 666-8200
Telex #13-5076

PRIME

TSI...YOUR FULL LINE VENDOR FOR ALL YOUR PRIME COMPUTER NEEDS
Buy ● Sell ● Lease ● Rent
National 800-222-3475
Florida 800-421-4135
Northeast 800-874-3475
Timesharing Services, Inc.
4080 Woodcock Drive
Jacksonville, Fl 32207

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
11460 N. CAVE CREEK RD.,
PHOENIX, ARIZONA 85020
(602) 997-0997
ASK FOR DON

UNISYS

BUY SELL LEASE
BURROUGHS
B-20 to B-7900
SPECIAL 207 DISK
(10 Units)
B900 DISK PACK (206 Style)
Subsystem
DEPOT MAINTENANCE
Computer Provisions
(216) 248-7878

UNISYS

Buy * UNISYS * Sell
Like-New Burroughs
Processors ● Peripherals - Certified
(Special: B1955, 1250LPM Printer)
New Plug-Compatibles
Printers: 400-1600LPM, 80PPM
Disk: High Speed - 1-4GB
UNISON TECHNOLOGY, INC.
(800) 234-4300 (404) 451-0000

WANG

HOLSON ASSOCIATES, INC.
Buy And Sell
Guaranteed
For Wang Maintenance
2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley or Carole Benson
(404) 980-1700

BUY IN CANADA WHERE YOUR U.S. DOLLARS GO FURTHER
Systems and Peripherals
Buy and Sell World Wide
Norcomex, Ltd
416-738-0803 or 416-736-1059
Telex # 06965391 TOR
FAX 416-738-5013

BUY - SELL
MVP/LVP ● OIS ● VS ● PC
SYSTEMS IN INVENTORY
VS-45 ● OIS ● VS-100
GENESIS
EQUIPMENT MARKETING
GEM
(602) 277-8230

NCR

Going Out Of Business For Sale
ONE YEAR OLD
NCR 9400 IP SYSTEM
UNDER FULL MAINTENANCE
*3 MB MEMORY
*247 MB DISK
*28 TTY LINES
*3 BMC LINES
*8430 600 LPM PRINTER
*(2) 6444 MATRIX PRINTERS
*(20) 7930 WORKSTATIONS
AVAILABLE IN OCTOBER
WALTHER FURNITURE
5675 JIMMY CARTER BLVD.
NORCROSS, GA 30071

DEC

BUY ● SELL ● TRADE
Planning to buy non-DEC memory? Check our DEC memory prices first!

1123-BE	MS86-CA	RD53A-AA
1173-BE	MS780-JA	RL02-AK
DMR11-M	MSV11-JE	RL02K-DC
MS11-PB	MSV11-QA	VT100-AA

NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

DEC
11/780
with or without Clustering
Distinctive Dataprocessing
214-869-2214

DEC

VAX 750 2MB-VMS	$9,900
DHU11	$2,895
UDA50	$2,200
DEC MATE II	$1,295
DEC MATE II w/HD	$2,295
DEC MATE III	$1,750
PRO350 (from)	$750
DECNA	$200
LA100 PC	$550
MS750 CA	$550
MS780 FD	$195
RXO2	$395
DLV11E	$95
DLV11J	$195
11/44	$5,200
Kennedy 9300	$1,995
MS 630 BA	$395
Rainbow B	$1,095
RX50	$295
DZ11E	$495
DZV11A	$195
CDC9766	$2,200
TE16 w/TM03	$1,595
RQDX3	$1,295
LA75 (New)	$675
RLO2 Packs	$69.00

Digital Computer Resale
(713) 445-0082

MERIDA TRADING GROUP
BUYS
SELLS
LEASES
All Digital Equipment
Please Call (617) 933-6790
Merida Trading Group

BUY SELL LEASE
DEC/VAX
CALL COMPUTER PROVISIONS
Lou Vascek
(216) 248-7878

TIME, SERVICES & SOFTWARE

Use the classified pages of COMPUTERWORLD to tell everybody about the TIME, SERVICES & SOFTWARE you have to offer
To place your ad, call us at 1-800-343-6474 (in Mass., call 617-879-0700) or send all materials to:
COMPUTERWORLD
Classifieds, Box 9171, 375 Cochituate Rd., Framingham, MA 01701-9171.

COMPUTING SERVICES

CPU 1	CPU 2
MVS/XA	VM/370
CICS	DOS/VSE
IMS	CICS
TSO	CMS

** IBM HARDWARE
** FULL TECHNICAL SUPPORT
** FOURTH GENERATION LANGUAGES
** NATIONWIDE ACCESS
** GUARANTEED RESPONSE AND AVAILABILITY
** FULL DISASTER RECOVERY BACKUP
** ON-SITE CUSTOMER AREA
** FULL SECURITY
** VOLUME AND TERM DISCOUNTS

For more information please contact:
BURNS COMPUTING SERVICES, INC.
i0 Gould Center
Rolling Meadows, IL 60008
Midwestern Sales (312) 981-5360
Eastern Sales (212) 432-1101 • (315) 398-3680

COMPUTER TIME
DOS/VSE, VM/CMS, RSCS, RJE
Timesharing, Batch Processing, Program development time, Overflow printing.
Two IBM 4341 CPU's
Reasonable rates, volume discounts, Fast turnaround.
Convenient New Jersey location
Disaster recovery hot-site with office space available.
Possible prime time dedicated machine.
Mailing services also available.
Contact:
Dennis Shedlock
(201) 545-5800

How to increase your power without paying the price.

Turn to Manufacturers Hanover Data Services Corporation for low-cost, state-of-the-art timesharing and Information Center services.

- Secure environment
- Software includes MVS/SP, VM/SP, VM/XA, TSO, GDDM, CMS, and Presentation Graphics Equipment
- Processing done on IBM 3084 MX3 and IBM 4381 systems
- Accessible via many telecommunications methods
- Volume discounts

For more information write:
Jeff Daum
Manufacturers Hanover Data Services Corporation
P.O. Box 26
Carlstadt, New Jersey 07072
Or call (201) 896-2030

MANUFACTURERS HANOVER

IBM is a trademark of International Business Machines Corporation.
© 1987 Manufacturers Hanover Trust

WIN-PLAN ™
Fully automated practical information systems planning.
Over 100 users
$495.00 fob Anycity, USA
Runs on IBM-PC XT/AT & compatibles
Windleaf, Inc. 1416 Venhorst Rd.
Colo. Spgs., CO 80920
(303) 598-0585 free brochure

DATA ENTRY has changed . . .
From keypunches to 3741s to FoxPlane, CADE, and Wordcraft . . . . Now even the most complex data entry is quickly moving to PCs. Whether on a stand-alone PC, or on dozens in an LAN, KeyEntry II is a software package that provides a comprehensive yet cost-effective data entry system. Its ease of use, productivity, and unmatched range of capabilities have made it the most widely used PC-based system in the world.
Isn't it time to bring your data entry up-to-date?
KeyEntry II®
Complete Evaluation Package just $42.50, delivered.
1-800-533-6879
In [illegible], SDS, Inc., 3732 Stewart Avenue South, Birmingham, AL 35233
DATA ENTRY

COMPUTER TIMESHARING

- We broker computer time.
- We find your lowest prices
- Nationwide Service.
- All mainframes.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

Call Don Seiden at
Computer Reserves, Inc.
(201) 688-6100

Why Pay More?

Take advantage of the latest hardware and software tools at our world class data center.

Realize immediate cost saving benefits by processing at our shared resource facility on IBM 3081 and 3090 computers in an MVS/XA environment.

- Full CICS, IMS, DB2 Services
- Service Level Guarantees
- Extensive Network Capabilities
- Client Help Desk Facility

Get The Facts—FREE!
Call Toll Free 800-225-7135
In Colorado (303) 430-8881

Security Pacific Information Systems, Inc.
1401 Del Norte Street
Denver, Colorado 80221

COMPUTERWORLD

SALES OFFICES

Publisher/James S. Povec

Vice President/Sales,Edward P. Marecki, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

BOSTON: Northern Regional Manager/Michael F. Kelleher, **District Managers/**David Peterson, Bill Cadigan, Sherry Driscoll, **Account Manager/**John Watts, **Sales Assistant/**Alice Longley, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

CHICAGO: Midwest Regional Manager/Russ Gerches, **District Managers/**Kevin McPherson, Larry Craven, **Account Manager/**Robert A. Raudys, **Sales Assistant/**Kathy Sullivant, **COMPUTERWORLD,** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

NEW YORK: Eastern Regional Director/Michael J. Masters, **Senior District Manager/**Doug Cheney, **District Managers/**Fred Lo Sapio, Frank Genovese, **Account Managers/**Paula Smith, Helene Tepperman, **Sales Assistants/**Mary Tagliareni, Sue Larson, Eileen Lobaugh, **COMPUTERWORLD,** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES: Western Regional Director/Mark V. Glasner, **District Managers/**Carolyn Knox, Gary Hooks, **COMPUTERWORLD,** 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Western Regional Director/Mark V. Glasner, **Senior District Manager/**Ernie Chamberlain, **District Managers/**Jan Harper, Stevan Phillips, **Account Manager/**Alicia Hodge, **COMPUTERWORLD,** 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Eastern Regional Director/Michael J. Masters, **District Manager/**Jeffrey Melnick, **Sales Assistant/**Melissa Christie, **COMPUTERWORLD,** 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Midwest Regional Manager/Russ Gerches, **District Manager/**Kevin C. Harold, **COMPUTERWORLD,** 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Eastern Regional Director/Michael J. Masters, **District Manager/**Bernie Hockswender, **COMPUTERWORLD,** 3022 Javier Road, Suite 210, Fairfax, VA 22031 (703) 280-2027

PRODUCT CLASSIFIED ADVERTISING: Product Classified Advertising/Account Manager Peter Slingluff, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING: National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England Recruitment Manager/Al DeMille, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers, 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy, 18004 Skypark Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress, 3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042 (703) 876-5100

Recruitment Telemarketing Account Executives: New England, New York/Jay Novack, **Mid-Atlantic/**Pauline Smith, **Midwest/**Ellen Casey, **Western/**Nancy Percival, 1-800-343-6474 or (617) 879-0700

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD,** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An IDG Communications Company

James S. Povec/**President**

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 617-879-0700, Telex: 95-1153, FAX: 617-875-8931

SALES Vice President/Display Sales, Edward P. Marecki. National Recruitment Sales Director, John Corrigan. Display Sales Operations Manager, Carolyn Novack. Display Advertising Production Manager, Maureen Carter, Classified Operations Manager, Cynthia Delany.

MARKETING Director of Marketing, Bob Singer. Marketing Services Manager, Audrey Shohan

PRODUCTION Production Director, Peter Holm. Senior Production Manager, Leigh Swearingen. Typesetting Manager, Carol Polack. Art Director, Tom Monahan.

CIRCULATION Circulation Director, Nancy L. Merritt.

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Manfred Weiss, CW Publikationen Velagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone: (011) 43 222486 5910. Telex: (847) 115 542 (SCH/A).

Brazil: Ney Kruel, Computerworld do Brazil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf. 386, Hungary, Phone: (011) 36 1 228 458. Telex: (861) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 335318.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only).

M. Nakamura, IDG Communications, Japan, c/o Marcom International, Inc., Akasaka Center Building, 1-3-12 Motoakasaka, Minato-ku, Tokyo 107, Japan. Phone: (011) 81 3 403-8515. Telex: (781) J27941 (reps for all CW Publishing publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Reg Birchfield, CW Communications Ltd., 13 Maidstone St., Grey Inn, Auckland 1, New Zealand. Phone: (011) 64 9 768 993. Fax: (011) 64 9 780 244.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 6174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zabala, Computerworld Espana, Rafael Calvo 18 4B, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 47894 (CW E).

Sweden: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710.

Taiwan: Leona Wang, ACE Mecia Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Gloys Inn Rd., London, WCI 8UT. United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346.

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE. United Kingdom. Phone: (011) 05 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350. (COMW D).

IDG COMMUNICATIONS/INC.

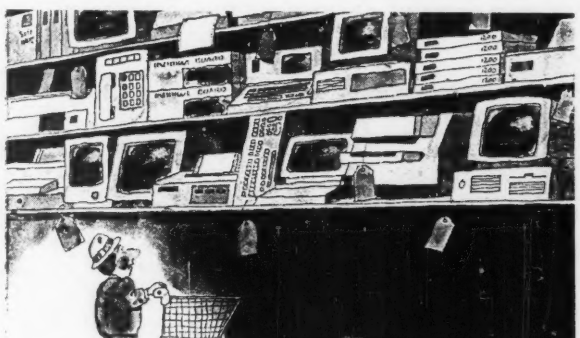
Patrick J. McGovern	Kasi Lobbins	William P. Murphy
Board Chairman	**Chief Executive Officer**	**Vice President/Finance**

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 90 computer publications in 33 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina;* ASIA'S *Communications World, Computerworld Hong Kong, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review;* AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo, Micro Mundo;* CANADA'S *Computer Data;* CHILE'S *Informatica, Computacion Personal;* DENMARK'S *Computerworld Danmark, PC World Danmark;* FINLAND'S *Mikro, Tietovilkko;* FRANCE'S *Le Monde Informatique, Distributique, infoPC, Telecoms International;* GREECE'S *Micro and Computer Age;* HUNGARY'S *Computerworld SZT, PC Mikroving;* INDIA'S *Dataquest;* ISRAEL'S *People & Computers Weekly, People & Computers Biweekly;* ITALY'S *Computerworld Italia;* JAPAN'S *Computerworld Japan;* MEXICO'S *Computerworld Mexico;* THE NETHERLANDS' *Computerworld Netherlands, PC World Benelux;* NEW ZEALAND'S *Computerworld New Zealand;* NORWAY'S *Computerworld Norge, PC World Norge;* PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly;* SAUDI ARABIA'S *Arabian Computer News;* SOUTH KOREA'S *Computerworld Korea, PC World Korea;* SPAIN'S *CIMWORLD, Computerworld Espana, Commodore World, PC World Espana, Communicaciones World, Informatica Industrial;* SWEDEN'S *ComputerSweden, MikroDatorn, Svenska PC World;* SWITZERLAND'S *Computerworld Schweiz;* UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, LOTUS, PC Business World;* UNITED STATES' *Amiga World, CD-ROM Review, CIO, Computer Currents, Computerworld, Computers In Science, Digital News, Federal Computer Week, GO Micro, FOCUS Publications, InCider, Infoworld, Macintosh Today, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish!, PC Resource, Run, Windows,* VENEZUELA'S *Computerworld Venezuela;* WEST GERMANY'S *Computerwoche, Information Management, PC Welt, PCWoche, Run.*

ADVERTISERS INDEX

Amdahl DASD	64
Arrix Logic Systems Inc.	99
Artificial Intelligence	65
AST Research Inc.	58
AT&T	14-15,54-55,88-89,S6-S7
Bell Atlantic	44-45
Beta Systems Software Inc.	56
B.I. Moyle	23
BMS Computer Inc.	39
C. Itoh Digital Products	S2
CGI Systems	24-25
Codex	76
Communication Networks	73,91
Compaq	105-107
Computer Technology Group	86
Compuware	92
Cullinet	9
CW Circulation	S10
CW Focus	94
CW IBM Extra!	74
CW Searchlink	126
CW Spotlight	SC3
Data General	SC4
Data Group	60
Electrohome	78
Fifth Generation	46
Gandalf Technologies	32,38
Gateway Communications	96
Genicom	SC2
Goal Systems	26
Hewlett Packard	28-29
Highland Express	98
Honeywell Bull	35
IBM	70-71
ICCP	85
Information Dimensions	16-17
Informix Software Inc.	60-61
Innovation Data Processing	5
Intelogic Trace	12-13
Interface Group	97,98,99,100,101
Interface Systems	90
ITT-CSG	48
JDS Microprocessing	39,41,43
McCormack & Dodge	87
Memorex	18-19
Michaels, Ross & Cole	13
Micro Focus	37
Mid-American Control Corp.	45
MSA	132
Must Software	16
NEC	80,131
Nynex	59
On-Line Software	22,50-51
Online/Database	97
Oracle	11
Output Technology Corp.	10
Presskits	93
Prime Computer	27
Rabbit Software	52-53
Racal Milgo	42
Realia	40
SAS Institute	36,57
SICOB	30-31
Software AG	69
Syncsort	3
Systems Center	75,77
Tandem	108
Tandon Computer	68
Technologic Software Concepts	33
Televideo	84
Texas Instruments	62-63
3Com	102-103
Travtech	98
Trax Softworks	75
Unicorn Systems Company	77
Unisys	81-83
Unix Expo	72
Updata	100
US Data	44
Usernet	104
Visible Systems	47
VM Software	7,85
VM/CMS Unlimited	34
Wyse Technology	66

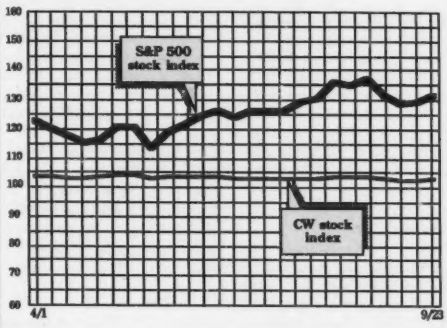
This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



Upcoming Computerworld Spotlight Sections

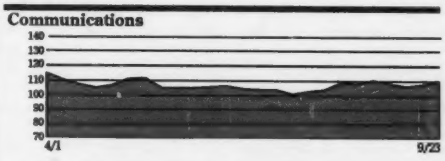
Issue Date	Topic	Ad Closing Date
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
Oct. 26	Unix	Oct. 9
Nov. 2	The Macintosh Market	Oct. 16
Nov. 9	Application Development Tools	Oct. 23
Nov. 16	Communications	Oct. 30
Nov. 23	Artificial Intelligence	Nov. 6
Nov. 30	Power Protection Equipment	Nov. 13
Dec. 7	DEC-Compatible Hardware	Nov. 20
Dec. 14	Add-In Boards	Nov. 25
Dec. 21	Spreadsheets Software	Dec. 4

STOCK TRADING INDEX



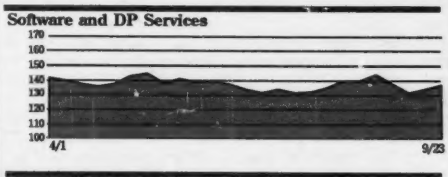
Indexes	Last Week	This Week
Communications	106.8	109.2
Computer Systems	128.0	129.9
Software & DP Services	133.5	136.5
Semiconductors	93.5	87.3
Peripherals & Subsystems	111.0	111.2
Leasing Companies	116.0	116.7
Composite Index	102.8	102.7
S&P 500 Index	129.1	131.7

Communications

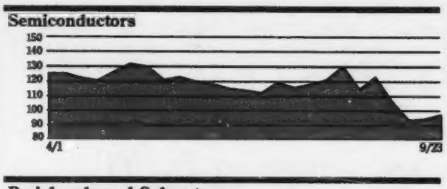


Computer Systems

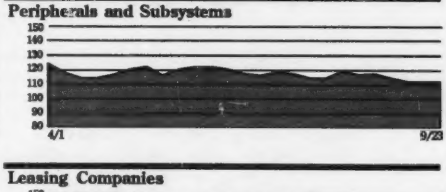
Software and DP Services



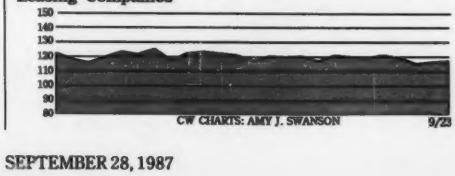
Semiconductors



Peripherals and Subsystems



Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES: WEDNESDAY, SEPT. 23, 1987

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 23 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	100	77	98.88	+2.6	+2.8
Q	ANDREW CORP	19	14	15.25	-0.8	-4.7
Q	ARTEL COMM CORP	5	2	2.75	-0.1	-4.3
N	AT&T	36	22	34.00	+2.4	+7.5
Q	AVANT GARDE COMP INC	7	3	4.75	+0.0	+0.0
Q	AVANTEK INC	19	13	15.88	+0.1	+0.8
K	AYDIN CORP	38	18	34.63	+2.4	+7.4
N	BELL ATLANTIC CORP	80	62	79.13	+4.5	+6.0
N	BELLSOUTH CORP	44	35	41.88	+2.3	+5.7
Q	BRIDGE COMMUNICATION	29	11	28.00	+0.1	+0.4
Q	COMPRESSION LABS INC	8	4	5.25	-0.1	-2.3
O	COMPUTER NETWORK TECH	6	3	3.88	+0.9	+29.2
O	CONTEL CORP	40	27	38.13	-0.1	-0.3
Q	DATA SWITCH CORP	9	5	7.38	+0.4	+5.4
Q	DIGITAL COMM ASSOC	49	19	43.00	+0.8	+1.8
Q	DYNATECH CORP	44	27	27.25	-2.8	-9.2
Q	EQUATORIAL COMM CO	5	2	3.25	+0.1	+4.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	+0.4	+5.5
Q	GENERAL DATACOMM INDS	14	7	7.25	-0.4	-4.9
N	GTE CORP	45	34	41.75	+1.4	+3.4
Q	INFOTRON SYS CORP	12	7	8.25	-0.8	-8.3
N	ITT CORP	66	47	61.88	+1.1	+1.9
N	M A COM INC	16	12	14.25	-0.6	-4.2
Q	MCI COMMUNICATIONS CORP	10	5	9.88	+0.6	+6.8
Q	MICOM SYS INC	18	10	11.00	-0.8	-6.4
Q	NETWORK SYS CORP	19	9	10.25	+0.3	+2.5
N	NORTHERN TELECOM LTD	24	14	22.88	+0.9	+4.0
Q	NOVELL INC	27	10	25.50	+1.5	+6.3
N	NYNEX CORP	77	59	75.75	+2.1	+2.9
N	PACIFIC TELESIS GROUP	32	23	31.00	+2.0	+6.9
N	PARADYNE CORP	9	4	7.25	+0.1	+1.8
A	PENRIL CORP	6	4	4.25	+0.0	+0.0
N	PLESSEY PLC	41	24	34.63	+2.1	+6.5
N	SCIENTIFIC ATLANTA INC	20	9	17.38	+0.3	+1.5
N	SOUTHWESTERN BELL CORP	44	33	42.75	+3.6	+9.3
Q	3 COM CORP	24	10	20.13	+0.1	+0.6
N	TIMEPLEX INC	41	15	28.88	+0.6	+2.2
Q	UNGERMANN BASS INC	16	8	8.50	-0.5	-5.6
N	U S WEST INC	59	45	58.50	+3.9	+7.1
Computer Systems						
Q	ALLIANT COMPUTER SYS	37	15	16.75	+0.3	+1.5
Q	ALPHA MICROSYSTEMS	7	3	4.75	-0.1	-2.6
Q	ALTOS COMPUTER SYS	17	10	13.88	+0.0	+0.0
A	AMDAHL CORP	48	19	48.25	+5.8	+13.5
Q	APOLLO COMPUTER INC	25	12	20.00	-0.1	-0.6
Q	APPLE COMPUTER INC	56	16	55.25	+3.5	+6.8
N	BOLT BERANEK & NEWMAN	30	19	20.75	+0.3	+1.2
Q	BRITTON LEE INC	5	3	3.75	-0.1	-1.7
N	COMPAQ COMPUTER CORP	62	15	61.13	+3.6	+6.3
Q	COMPUTER AUTOMATION INC	17	2	14.00	+1.5	+12.0
A	COMPUTER CONSOLES INC	12	4	5.13	-0.4	-6.8
Q	CONCURRENT COMP CORP	24	13	19.25	-0.3	-1.3
Q	CONTROL DATA CORP DEL	37	24	36.63	+2.6	+7.7
Q	CONVERGENT TECH	12	4	7.13	-0.3	-3.4
Q	CONVEX COMPUTER CORP	22	8	14.25	-0.1	-0.9
N	CRAY RESH INC	136	69	93.75	-2.8	-2.8
Q	DAISY SYS CORP	13	7	7.75	+0.4	+5.1
N	DATA GEN CORP	39	25	31.63	+1.1	+3.7
N	DATAPOINT CORP	9	4	8.38	+0.6	+8.1
N	DIGITAL EQUIP CORP	198	89	189.38	+2.5	+1.3
N	FLOATING POINT SYS INC	17	8	8.63	-0.5	-5.5
N	GOULD INC	25	16	23.13	+0.0	+0.0
N	HARRIS CORP	43	28	39.25	+0.0	+0.0
N	HEWLETT PACKARD CO	70	37	70.00	+6.3	+9.8
N	HONEYWELL INC	91	58	80.25	-0.5	-0.6
N	IBM	176	116	154.25	-2.4	-1.5
Q	INFORMATION INTL INC	17	13	13.00	+0.0	+0.0
Q	IPL SYS INC	3	2	2.88	-0.1	-2.1
Q	MASS COMPUTER CORP	13	5	11.00	-0.5	-4.3
N	MATSUSHITA ELEC INDL LTD	180	93	177.00	-2.3	-1.3
Q	MEGADATA CORP	7	2	5.50	-0.5	-8.3
Q	MENTOR GRAPHICS CORP	37	13	34.13	+0.0	+0.0
N	NBI INC	14	8	10.88	+0.0	+0.0
N	NCR CORP	87	42	81.88	+2.8	+3.5
N	PRIME COMPUTER INC	31	16	27.13	+0.3	+0.9
Q	PYRAMID TECHNOLOGY	12	4	8.50	-0.1	-1.4
Q	STRATUS COMPUTER	41	18	29.50	+1.3	+4.6
Q	SUN MICROSYSTEM INC	46	13	36.38	+0.8	+2.1
Q	SYMBOLICS INC	7	4	3.88	-0.1	-3.1
N	TANDEM COMPUTERS INC	38	17	31.75	+1.6	+5.4
N	TANDY CORP	56	31	50.38	+2.8	+5.8
N	ULTIMATE CORP	35	13	35.00	+4.1	+13.4
N	UNISYS CORP	48	23	44.75	+1.3	+2.9
A	WANG LABS INC	19	11	17.50	-0.1	-0.7
Software & DP Services						
Q	ADVANCED COMP TECH	5	3	4.25	+0.4	+11.5
N	ADVANCED SYS INC	29	12	27.00	-0.5	-1.8
N	ASK COMPUTERS INC	22	9	21.38	+0.1	+0.6
Q	AMERICAN MGMT SYS INC	19	7	17.00	+0.0	+0.0
Q	AMERICAN SOFTWARE INC	22	8	12.88	-0.3	-1.9
N	ANACOMP INC	11	3	10.38	+0.8	+7.8
Q	ANALYSTS INTL CORP	9	3	8.00	+0.3	+3.2
Q	ASHTON TATE	30	14	26.25	+2.3	+9.4
Q	ASK COMPUTER SYS INC	17	10	14.50	+1.1	+8.4
Q	AUTODESK INC	34	10	29.25	+0.5	+1.7
N	AUTO DATA PROCESSING	55	32	52.50	+3.3	+6.6
Q	BOOLE & BABBAGE INC	12	4	10.50	+0.3	+2.4
N	COMPUTER ASSOC INTL INC	35	11	34.38	+2.4	+7.4
Q	COMPUTER HORIZONS CORP	15	10	11.63	+0.1	+1.1
N	COMPUTER SCIENCES CORP	66	30	64.88	+6.5	+11.1
N	COMPUTER TASK GROUP INC	18	12	15.25	+0.9	+6.1
Q	COMSHARE INC	28	11	23.00	-1.0	-4.2
N	CULLINET SOFTWARE INC	14	6	12.75	+0.0	+0.0
Q	CYCARE SYS INC	11	7	9.75	+0.3	+2.6
Q	DUQUESNE SYS INC	33	14	16.25	+0.8	+4.8
Q	ENDATA INC	16	6	15.50	+0.1	+0.8
N	GENERAL MTRS (CLS E)	49	24	48.13	+0.4	+0.8
Q	HOGAN SYS INC	17	8	8.13	+0.5	+6.6
Q	INFORMIX CORP	23	7	23.25	+1.0	+4.5
Q	INTELLICORP INC	11	4	5.75	-1.3	-17.9
Q	IKEANE INC	10	5	8.38	+0.3	+3.1
Q	LOTUS DEV CORP	37	12	33.25	+3.3	+10.8
Q	MANAGEMENT SCI AMER	21	11	13.00	+0.8	+6.1
Q	MICRO PRO INTL CORP	8	2	6.00	-0.2	-3.0
Q	MICROSOFT CORP	64	14	60.25	+1.8	+3.2
Q	NATIONAL DATA CORP	34	19	29.75	-2.9	-8.8
Q	ON LINE SOFTWARE INTL INC	22	6	17.38	-2.3	-11.5
Q	ORACLE SYS CORP	30	7	29.75	+2.3	+8.2
N	PANSOPHIC SYS INC	23	12	21.88	+1.0	+4.8
Q	POLICY MGMT SYS CORP	30	15	25.25	+1.0	+4.1
Q	PROGRAMMING & SYS INC	13	8	12.50	+0.3	+2.0
Q	REYNOLDS & REYNOLDS CO	39	27	31.25	-2.5	-7.4
Q	SEI CORP	18	8	16.00	-0.5	-3.0
Q	SHARED MED SYS CORP	53	23	27.00	+1.4	+5.4
Q	SOFTWARE AG SYSTEMS INC	19	10	12.50	+0.3	+2.0
Q	SOFTWARE PUBG CORP	17	5	9.50	+0.3	+2.7
A	STERLING SOFTWARE INC	16	9	10.88	+2.1	+24.3
Q	SUNGARD DATA SYS INC	21	10	17.75	+0.8	+4.4
Q	SYSTEMATICS INC	30	14	27.25	-0.1	-0.5
N	URS CORP	23	13	20.25	-1.9	-8.5
Q	VM SOFTWARE INC	45	14	15.00	-0.8	-4.8
Semiconductors						
N	ADV MICRO DEVICES INC	25	13	22.38	+1.5	+7.2
N	ANALOG DEVICES INC	24	14	17.50	-1.8	-9.1
Q	ANALOGIC CORP	13	10	11.38	-0.6	-5.2
Q	INTEL CORP	58	18	58.00	+4.0	+7.4
Q	LSI LOGIC CORP	17	8	13.13	+0.4	+2.9
N	MOTOROLA INC	72	34	70.63	+5.6	+8.7
N	NATL SEMICONDUCTOR	19	8	18.88	+1.9	+11.0
N	TEXAS INSTRS INC	78	35	77.38	+5.5	+7.7
A	WESTERN DIGITAL CORP	33	13	23.63	+0.6	+2.7
Peripherals						
N	AM INTL INC	9	5	7.63	+0.1	+1.7
Q	AST RESH INC	23	11	19.13	+0.3	+1.3
Q	AUTO TROL TECH CORP	9	3	5.75	-0.2	-3.2
Q	BANCTEC INC	16	7	12.25	+0.0	+0.0
Q	CIPHER DATA PRODS INC	18	9	11.13	-0.4	-3.3
A	COGNITRONICS CORP	5	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	27	19	26.50	+1.0	+3.9
Q	COMPUTERVISION CORP	23	13	14.13	-0.3	-1.7
A	DATAPRODUCTS CORP	16	10	12.00	+0.8	+6.7
A	DATARAM CORP	9	7	7.75	+0.1	+1.6
N	DECISION INDS CORP	13	7	11.38	+0.4	+3.4
N	EASTMAN KODAK CO	104	53	101.00	+2.0	+2.0
Q	E M C CORP MASS	29	9	23.00	-2.8	-10.7
Q	EMULEX CORP	10	6	7.25	+0.4	+5.5
Q	EVANS & SUTHERLAND	40	21	28.25	+0.8	+2.7
Q	ICOT CORP	13	5	6.38	+0.3	+4.1
Q	INTERLEAF INC	20	8	18.88	+0.0	+0.0
Q	IOMEGA CORP	8	2	2.75	-0.1	-4.3
Q	LEE DATA CORP	10	5	5.38	-0.3	-4.4
Q	MASSTOR SYS CORP	6	3	4.06	+0.2	+4.9
Q	MAXTOR CORP	34	10	13.13	+1.3	+10.5
Q	MICROPOLIS CORP	44	15	27.63	-1.6	-5.6
Q	MINISCRIBE CORP	18	7	14.88	+1.0	+7.2
N	MINNESOTA MNG & MFG CO	84	50	80.13	+4.4	+5.8
A	MSI DATA CORP	24	10	22.88	+0.4	+1.7
Q	PRIAM CORP	6	2	2.63	-0.1	-4.5
Q	PRINTRONIX INC	13	10	11.38	+0.0	+0.0
N	QMS INC	26	11	25.63	+0.6	+2.5
Q	QUANTUM CORP	35	15	16.25	-1.0	-5.8
Q	RAMTEK CORP	6	4	5.38	+0.4	+7.5
N	RECOGNITION EQUIP INC	27	12	16.38	-0.1	-0.8
Q	REXON INC	14	5	7.25	-0.8	-9.4
Q	SCAN TRON CORP	17	11	13.00	+0.3	+2.0
Q	SEAGATE TECHNOLOGY	46	14	19.75	-2.3	-10.2
N	STORAGE TECH CORP	5	2	3.00	+0.0	+0.0
Q	TANDON CORP	7	2	3.13	+0.1	+4.2
A	TEC INC	7	3	4.88	+0.3	+5.4
N	TEKTRONIX INC	43	30	34.38	-1.1	-3.2
Q	TELEVIDEO SYS INC	3	2	2.75	-0.2	-6.4
N	TELEX CORP	102	46	45.88	-5.5	-10.7
Q	WYSE TECH	36	13	33.50	-0.4	-1.1
N	XEROX CORP	85	51	79.63	+1.1	+1.4
Q	XIDEX CORP	16	11	11.75	+0.5	+4.4
Leasing Companies						
N	COMDISCO INC	35	15	32.75	+0.3	+0.8
N	CONTINENTAL INFO SYS	14	7	10.13	+0.1	+1.3
Q	PHOENIX AMERN INC	8	3	4.63	+0.1	+2.8
Q	SELECTERM INC	7	5	5.00	-0.1	-2.4
N	U S LEASING INTL	55	42	48.75	+0.3	+0.5

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Bulls return

Compaq posts new high; Microsoft marks 2-for-1 split

A record-setting week for the Dow Jones industrial average saw the bulls return ferociously to the computer industry.

The Dow gained a record 75.23 points last Tuesday, but the run-up in most leading computer stocks lasted throughout the first four trading days. Among the big winners was Compaq Computer Corp., which this week will announce two new highly touted micros and the bundling of Microsoft Corp. Windows. Compaq closed at a new high of 65⅞ Thursday, up 7⅝ points for the week and 4¾ points on Thursday alone.

Microsoft registered its previously announced 2-for-1 split and closed Thursday at 61¼. Lotus Development Corp. was up 2¼ points in four days to 33¼, and Ashton-Tate rose 3½ points to 27¾.

Among New York Stock Exchange issues reaching new highs for the year in Thursday's trading were AGS Computers, Inc., 23; Computer Sciences Corp., 67½; Control Data Corp., 37; Data Design Associates, 9⅝; and Ultimate Corp., 36.

Despite a big surge Tuesday, IBM gained only half a point in four days to 155⅞. Digital Equipment Corp. rose 2⅜ to 189⅞.

CLINTON WILDER

Network Systems offers Ethernet

BY ELISABETH HORWITT
CW STAFF

MINNEAPOLIS — Seeking to expand out of host channel-to-channel networking into the smaller system market, Network Systems Corp. recently announced interfaces between its proprietary network Hyperchannel and networks complying with CCITT 802.3 Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP).

"Our Ethernet-TCP/IP products will perform two functions," said Harold Durrett, the company's vice-president of information systems. "They will connect hosts on Hyperchannel to Ethernet networks, and they will allow Hyperchannel to be used as a backbone for Ethernet networks."

Network Systems' IP Router provides access to Hyperchannel-connected hosts for systems too small to cost-justify a direct link to Hyperchannel, Durrett noted. Hyperchannel is a 50M bit/sec. proprietary network designed to support bulk data transfer between multiple hosts.

> "OUR GOAL is to provide Hyperchannel interfaces to TCP/IP for all major mainframes."
>
> HAROLD DURRETT
> NETWORK SYSTEMS CORP.

Network Systems provides direct Hyperchannel links for Sun Microsystems, Inc. and Apollo Computer, Inc. computers at a cost of $10,000 per workstation.

This was hard for customers to accept, since these systems have built-in Ethernet interfaces, according to Durrett.

Customers who want a low-cost, high-speed connection between a computer-aided design and engineering workstation and a host on Hyperchannel can dedicate an Ethernet to each workstation and route up to eight networks through the IP Router, Durrett said. The IP Router is priced at $45,000, making the networking cost per workstation a little more than $5,600. Interface cost is much lower for workstations whose lower speed networking needs allow Ethernet sharing, Durrett noted.

The company's decision to support Ethernet and TCP/IP reflects its realization that "Ethernet is an industry standard, and TCP/IP will be around for at least four or five years," Durrett stated. Network Systems has developed Hyperchannel drivers for TCP/IP implementations on a variety of computers, including IBM MVS and VM systems, Digital Equipment Corp. VAX/VMS and Ultrix systems and AT&T Unix System V hosts. "Our goal is to provide Hyperchannel interfaces to TCP/IP for all major mainframes," Durrett said.

"Network Systems has obviously fixed an important gap in their product line — they have recognized TCP/IP as a de facto standard, where for a long time they thought *they* were a de facto standard," said Bart Stuck, a vice-president at Morristown, N.J., firm Probe Research, Inc.

Design issues

However, Network Systems still "has to think through certain design issues" related to the fact that Hyperchannel interfaces are designed specifically to handle large file transfers, Stuck pointed out. "Hyperchannels can only support the transfer of one data block at a time, and because of the way they handle buffering, a 50M bit/sec. link has an effective end-to-end throughput of well under 10M bit/sec."

According to Stuck, this degradation problem is likely to be compounded if, in addition to hosts performing bulk data transfer, multiple workstations are transmitting queries to the hosts — particularly since Hyperchannel was not designed to handle short queries.

The IP Router will route transmissions from a 10M bit/sec. Ethernet to either a host residing on Hyperchannel or a system residing on another Ethernet. The IP Router's multiprocessor architecture is said to support a total throughput of 100M bit/sec. Volume shipments are scheduled for March 1988, according to Network Systems.

Network Systems also announced three bridges. The Ethernet Bridge for Hyperchannel-10 is said to allow multiple Ethernets to pass data back and forth over a 10M bit/sec. Hyperchannel. Priced at $8,500, it is available immediately.

The Ethernet Bridge for Hyperchannel-50 uses a 50M bit/sec. Hyperchannel as backbone. Priced at $13,500, it is scheduled for December shipment.

The Ethernet Bridge for T1 links connects to Ethernet local-area networks across a 2M bit/sec. T1 link, as specified by the European T1 standard. It is available now, priced at $12,500.

Net management highlights TCA '87

Telecom vendors and users meet to iron out difficulties of larger systems

BY KATHY CHIN LEONG
CW STAFF

SAN DIEGO — After a year of frantic one-upmanship in the network management arena, telecommunications vendors will move the battle directly into the users' arena at this week's Tele-Communications Association show, TCA '87.

According to Lionel Gillerman, TCA president, the growing size of networks and the complexity of integrating voice and data on communications lines are the reasons network management is this year's hot button. "People are looking for new ways of managing their networks, and vendors are getting a lot more responsive," he said.

Some 15,000 attendees are expected to crowd the show's aisles. Among them, Hal Terry, telecommunications manager at California First Bank in San Francisco, will be looking for help managing the transmission of data over T1 lines. "We are just starting to take advantage of T1, and the crux of the subject is how to control and manage these networks effectively," he said last week.

Dugal Easton, a regional TCA president based in Seattle, agreed. "Since I work for a school district where money is tight, there is a pretty small data communications staff. If we make any network moves, we will need to order a huge number of data lines, and we will need sophisticated network management tools to manage our network well."

Vendors said they are planning to showcase a variety of products in hopes of capitalizing on the demand for network management aids.

Micom Systems, Inc. in Simi Valley, Calif., will introduce an IBM Personal Computer-based network management system for its CCITT X.25 packet-switching product line. The Micom X.25 Control Center (XCC) is a $5,500 software package that is said to help users manage their Micom packet-switching network from one PC.

According to Micom officials, XCC software allows users to download billing information and statistics. In addition, it offers an alarm feature that graphically alerts the user when the network is in trouble. Micom will also announce a new packet switch and two packet assembler/disassemblers.

Avanti Communications Corp. in Newport, R.I., will be adding to the show's collection of network management products with its Open Network Management System, a $69,000 hardware and software tool that manages the company's T1 Open Network Exchange processor and Ultramux T1 multiplexer.

According to George Kirching, Avanti's senior vice-president of marketing, the network management system is based on a Sun Microsystems, Inc. workstation. The product will offer graphics representations of user networks and will provide automatic trouble-ticketing, a data base, long-term statistics recording and network alarms.

Exchange alliance

Racal-Milgo, based in Sunrise, Fla., has announced an alliance to link its network management system with that of T1 and modem vendor Digital Communications Associates, Inc. (DCA) in Alpharetta, Ga. Under the pact, the companies will exchange products and services, specifically the DCA/Cohesive System 9000 T1/T3 multiplexer and Racal-Milgo's customer support services.

The Racal-Milgo marketing plan, according to company marketing executive Jim Norman, includes focusing efforts on multivendor network management.

To fulfill that same goal, Micom has developed a software package called CMS/View that integrates the Micom CMS proprietary network management system with IBM's Netview.

The ability to integrate products into the IBM Netview environment will be a popular act at the show. Aside from showing its new line of synchronous modems, Racal-Vadic in Milpitas, Calif., is scheduled to demonstrate how its Uplink/N software links the Racal-Vadic MDS II Dial Access Network Management System to Netview. Uplink/N lets a Netview user monitor the MDS network as MDS messages appear on the Netview screen, Racal-Vadic said.

T1 additions rife

Several TCA '87 exhibitors will show additions to their T1 switch lines. Among the 19 products and enhancements that General Datacom Systems, Inc. said it plans to unveil at the show is the Megaswitch Compact, a low-end addition to the company's Megamux family of T1 multiplexers that targets customer sites with modest data traffic.

General Datacom is also slated to announce a gateway that allows the company's T1 switches to interface with carrier services that are compatible with AT&T's Digital Access and Cross Connect System.

Other General Datacom announcements will include a series of diagnostic modems and a second-generation data-over-voice product that can access public packet networks.

Racal-Milgo, which is seeking to establish itself as a full-service networking company, will begin manufacturing its own T1 multiplexers for the first time. Its first mid-range T1 Omnimux switch is slated to be released in the first quarter of next year.

Major packet-switching vendors will also be showing their wares at TCA '87. Among them will be Western Union Corp. in Upper Saddle River, N.J., which said it will announce an 800-number dial-up service for its packet-switching data network. With 800 Data, Western Union users' customers can dial a single 800 number to tap the network without incurring charges for the local call.

Modem makers work overtime for TCA

While the focus at the Tele-Communications Association show will be on network management, modem makers are expected to launch several major products.

- Concord Data Systems, Inc. in Marlboro, Mass., is scheduled to expand its 2.4K bit/sec. modem line with announcements of the 224 Autodial Plus and the 224 Autodial Plus-E error-correcting model, priced at $425 and $595, respectively. The modems are said to feature Microcom, Inc.'s Microcom Network Protocol Class 4 error protection and to support asynchronous and synchronous operation.
- Concord and rival modem manufacturer Cermetek Microelectronics, Inc. in Sunnyvale, Calif., will both announce a dramatic drop in the price ceiling of 9.6K bit/sec. dial-up modems, which have generally cost $2,400. Priced at $1,795, Concord's 296 Trellis modem is an asynchronous 9.6K bit/sec. modem supporting the CCITT V.32 modem standard with full-duplex communications capabilities.
- Cermetek is also slated to preview its low-cost dial-up asynchronous V.32 9.6K bit/sec. modem, priced at $1,595. The Cermetek 9600DA features echo cancellation, autodial and autoanswer capabilities and supports most personal computer communications packages.
- Case Communications, Inc. in Columbia, Md., is slated to demonstrate a 4.8K bit/sec. modem that supports full-duplex transmission over dial-up lines.

Moving out

FROM PAGE 1

their data centers out of the downtown area. Everyone is looking for cheaper space somewhere else," says William Tuite, senior vice-president of Drexel Burnham Lambert, Inc., whose firm has begun construction on a northern New Jersey site that it hopes to occupy in 1989.

"People are outgrowing their 1960s-vintage buildings. And the 16th floor is not the best location for a data center," says A. S. "Migs" Damiani, president of Com-Site International, Inc., a Beltsville, Md., firm specializing in data center construction.

Damiani describes the ideal spot for a data center as a low-rise building with plenty of space and room for expansion. It should be near a labor pool with reliable workers who need not be paid exorbitant wages. The lower the rent, the better.

Fewer and fewer cities offer those conditions, especially the low rents. In some areas of New York, for example, 20-year leases signed in the 1960s are expiring.

Originally set at $10 per square foot, those leases are being rewritten in the $40 per square foot range, Damiani says. Tenants can rent for half that amount in New Jersey.

More space, less money

Paine Webber, Inc. and Drexel Burnham are two companies that chose the lower cost and more spacious accommodations of the suburbs. Both firms have relocated their data centers in Lincoln Harbor, a development under construction on the western bank of the Hudson River, in New Jersey.

Drexel liked the idea of building a new data center from the ground up, Tuite says. "We could have a data center with 36-foot column spacing so [an IBM 3090 Model] 400 or 600 can be put up in a day."

"There was just no more room to grow in the [old] building," says Jim Yee, corporate vice-president and director of technology at Paine Webber. "There was no [uninterruptible power supply] or raised floor in the old facility either," he says. Paine Webber's new, four-story facility offers 140,000 square feet of usable data center space.

The Chase Manhattan Corp. is planning a new data center in Holmdel, N.J., a township some 50 miles from New York. Chase selected Holmdel for its one-hour commuting distance from New York; its demographics, which were conducive to attracting financial services employees; its quality of life; and the 50 acres of land that were available, according to a Chase Manhattan spokeswoman.

Although Chicago's downtown rents are more reasonable than New York's, some companies are still moving to the suburbs in an attempt to avoid higher taxes and space restrictions.

The major difference between urban and suburban rents in the Chicago area is city taxes, says Cynthia Frank, vice-president of office properties at Rubloff, Inc., a Chicago real estate firm. Rents only differ by $2 to $3 per square foot, while taxes in the city are as much as $10 per square foot compared with only a few dollars per square foot in the suburbs.

Controlling costs

Floral Network, Inc., a Chicago subsidiary of Florists' Transworld Delivery Association, was looking for more space — and greater control over costs — when it decided to move from a building in downtown Chicago built in 1909 to a two-story building in the western suburb of Downers Grove, Ill. The $1 million move, completed during the July 4th weekend, more than doubled Floral Network's computer room floor space to 7,000 square feet.

"We are the only tenant here," said Dennis Blondell, assistant director of operations at Floral Network, "so we have total control of the environment." The company's previous building at 165 N. Canal St. was a multitenant building in a congested portion of the city.

The move, for all its improvements, caused a temporary setback in staffing. Because the new site is not accessible by Chicago's rapid-transit system, many workers without cars were stranded in the city.

Floral Network lost 95% of the part-time personnel who had answered phoned-in floral orders and 40% of its supervisory and full-time employees. But now, three months later, overall employment is greater than it was in downtown Chicago, with a total staff of 153 compared with 115 previously.

> THE IDEAL spot for a data center is a low-rise building with room for expansion. The lower the rent, the better. Few cities offer those conditions.

Com-Site's Damiani says Philadelphia, like Chicago, boasts reasonable rents for computer operations. In addition, the wages that must be paid for reliable data processing personnel there are not out of line. "Philly is not as bad as New York overall," he says.

However, San Francisco has seen several data processing operations pull up stakes in recent years. Two years ago, McKesson Corp. established a data center in Rancho Cordova, Calif., a suburb more than an hour away from the company's headquarters in San Francisco. According to Jack Pfiefer, McKesson director of information systems, the data center costs in Rancho Cordova about half what it would in downtown San Francisco.

"There's no question that moving outside the city is less expensive," Pfiefer said. "With data communications so sophisticated, there's no reason to keep a data center at the headquarters."

Although MCI Telecommunications Corp.'s activities are also centered in San Francisco, the company also decided to house its computer billing facilities in Rancho Cordova near McKesson in October 1983.

Bankamerica Corp. last year established the Bank of America Technology Center, a backup site in the suburb of Concord, Calif.

Damiani says that in Washington, D.C., buildings downtown are subject to height restrictions of 12 to 13 stories so that they not detract from landmarks. Builders have made the stories unusually short, making it difficult to put in the raised floors needed by computer rooms.

However, Washington rents are much more attractive than those in New York. "You can't compare New York and D.C.," Damiani says. Washington rents are about $24 per square foot, while those in New York are $40 and up. Even so, Washington rents are too high for some organizations.

Too much money

"It's just too expensive downtown," says Jim Draper, director of the computer services group for the U.S. Department of Housing and Urban Development. Draper is currently examining real estate outside Washington's Beltway, where he plans to build a second data center.

"Real estate costs are one-third higher [in the District of Columbia] than elsewhere [in the Beltway area]," offered William Ringler, senior vice-president of First American Bancshares, Inc., which recently consolidated three Capitol-area data centers into one Reston, Va., location. Reston, he says, is a good location from which to recruit DP professionals, although it is not as good for finding clerical employees.

Bob Cunningham, vice-president of Spaulding and Slye Co., a Boston real estate firm, says the major DP exodus in that city took place in the 1970s, when State Street Bank & Trust Co. moved south to Quincy, Mass., and Bank of Boston Corp. moved to suburban Malden, Mass.

"They went to fringe areas with good transportation to downtown," Cunningham says.

Now, Boston-area firms are eyeing East Cambridge, Mass., an industrial area near Harvard University and MIT that has been attracting high-technology companies, most notably Lotus Development Corp.

Faced with the outflow of DP shops, which represent jobs and tax money, as well as prestige, New York has been fighting back. The city is offering a feast of incentives for companies that lease space at the Metropolitan Technology Center [Metrotech], a 16-acre office complex slated to be built in downtown Brooklyn.

Metrotech will consist of 11 buildings and 4.2 million square feet. Ground breaking is expected by year's end, with initial occupancy scheduled for 1990.

The Securities Industry Automation Corp. (SIAC), the data processing company jointly owned by the New York and American Stock Exchanges, has agreed to build a second DP site at Metrotech. SIAC is currently housed in offices in Manhattan's financial district.

If SIAC were to remain at its Water Street offices for the next 10 years, the cost over that period would be about $171 million, SIAC estimated. By reducing its space at Water Street and moving 800 of 1,100 people to Metrotech, the cost would be $191 million. The result, SIAC calculated, was that for an additional $2 million annually for 10 years, SIAC would gain about 80,000 square feet of space and a second processing site.

Staying put

Morgan Stanley Group, Inc. also took the city up on a set of incentives and, in February 1988, will move its operations department and data center to a 16-story office building in downtown Brooklyn adjacent to Metrotech. Morgan Stanley will initially occupy roughly one-third of the 600,000-square-foot building, called One Pierrepoint Plaza, which is being built by the same developers as Metrotech.

Merrill Lynch & Co. was also offered substantial incentives to keep a data center in New York. Last July the firm disclosed that it would relocate its Capital Markets data centers to Staten Island in a development called Teleport, a high-tech office complex in which the company is a partner.

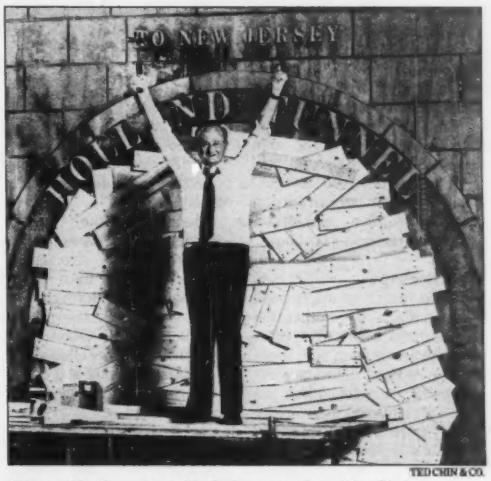
Teleport, a Merrill Lynch joint venture with the Port Authority of New York and New Jersey, New York City and Western Union Communications Systems, Inc., is billed as a satellite communications center and intelligent commercial park incorporating a 150-mile regional fiber-optic network. Construction began in August on the 6.5-acre site, where Merrill Lynch is to occupy a two-story, 126,500-square-foot building in mid-1989.

Not all financial services firms are abandoning lower Manhattan, however. Last November, Shearson Lehman Brothers, Inc. moved into a spanking-new $200 million data center at the north end of the financial district, bordering Soho [CW, March 9].

Shearson Lehman wanted to stay in Manhattan, despite its higher costs, in order to be close to Wall Street, says William O'Neil, vice-president of technical planning. "If you can get market information faster than your competitor, you stand to make more money. In this business, 30 seconds is too long a wait."

Despite the city's inducements, the wise choice for most firms is still to move out, says Com-Site's Damiani. "Even though Mayor Koch is trying, the economic incentives are not comparable," he says.

West Coast Bureau Manager Kathy Chin Leong and Midwest Correspondent Jean S. Bozman contributed to this report.



TED CHIN & CO.

Mayor Koch *wants to block the escape from New York.*

Software AG offers DEC-specific tool

BY ROSEMARY HAMILTON
CW STAFF

RESTON, Va. — Software AG of North America, Inc. plans to announce today a networking utility that is its first product designed specifically for Digital Equipment Corp. hardware.

Network is intended to provide users with access to Software AG's data base management system in a distributed DEC environment, but the networking utility can also provide access across IBM and DEC platforms, according to Michael Schowalter, director of DEC programs for Software AG.

The company is also slated to announce today the availability of Predict, a data dictionary, and Super Natural, an end-user development environment, for the DEC VAX platform.

All three products introduced this week reportedly will come under Software AG's recently implemented graduated pricing structure.

The company currently offers two other products for the DEC market: its Adabas DBMS and Natural fourth-generation language development environment. Both products had originally been designed for IBM mainframes.

Network was designed to work with DEC's networking system, Decnet, Schowalter said. The utility is said to automatically locate data requested by users, enabling them to update data without knowledge of where it actually resides.

The network utility is available now and ranges in price from $2,500 for low-end Microvaxes to $20,000 for high-end VAXs.

Super Natural is set to be available in November, with prices starting at $3,130. Predict is shipping now, and its license fee also starts at $3,130, the company said.

Long wait

FROM PAGE 1

The first units of the 950 were delivered last Monday to a U.S. division of Canada-based Northern Telecom Ltd., a longtime HP customer. HP officials thanked users for their patience during what they called the company's "probationary period."

"While we've been a little slow, we think we're headed in the right direction," said John Young, HP's president and chief executive. "We have arrived at the finish line; at least we're declaring victory."

Although HP trailed many other vendors in developing 32-bit superminicomputers, Young said many competitors are now exploring the route that HP chose. "They are now investigating RISC architecture, which used to be considered too avant-garde to be a real machine," he said.

Young said sales of the Series 950 will not affect revenue this fiscal year. Already, however, demand for the 950 is outstripping orders for the 930, he said.

Additionally, HP revealed performance results from beta tests conducted the past several months at user sites. Users tested HP's 16-bit HP 3000 Series 70 against the 950 in a number of different applications.

In traditional applications, the 950 performed as much as three times better than the Series 70 in batch applications and up to two times better than the 70 in interactive applications, HP officials said. They said the 950 achieves better performance in compute-intensive applications than in interactive applications.

User findings

HP said users at McDonnell Douglas Corp. found that the 950 performed 20 times better than the Series 70 in SQL applications. At Pepsico, Inc., according to HP, users found that the 950 outperformed the 70 by slightly more than four times in a compute-intensive application in which Pepsico was compiling sales and marketing information.

Performance levels will be slightly lower for applications ported from the Series 70 to the 950 in the new system's compatible mode, HP said.

Original shipments of the 930 and 950 were scheduled for late 1986 and early this year, respectively. Those dates were later amended, with the 930 slated for mid-1987 shipment and the 950 projected for the fourth quarter of this year.

The first units of the 930 were delivered in August. HP officials said "early" shipment of the 950 resulted from better than expected performance by the system during beta testing.

While HP's RISC-based HP 3000 line has been well received by industry analysts and users, some observers have questioned whether HP possesses the marketing expertise to sell those systems against more aggressive competitors like Digital Equipment Corp.

Young dismissed the criticism. "Basically, when you have a few clouds over your product line, it's hard to go out there and sell aggressively," he said. "We're going to be much more aggressive in the marketplace."

CORRECTIONS

The SQL in Release 8 of Applied Data Research, Inc.'s relational data base management system, Datacom/DB [CW, Sept. 21], will support the most commonly used extensions of IBM's SQL in DB2. The product is compatible with ANSI-standard SQL.

Printer Systems Corp. [CW, Aug. 24] is located at Suite 200, 9055 Comprint Court, Gaithersburg, Md. 20877.

Raj Jaswa [CW, Aug. 10] is senior product marketing manager at Chips and Technologies, Inc.

Richard Fisher and Kalthoff-Fisher Associates [CW, Aug. 24] are located in Los Gatos, Calif., and Cincinnati.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), June (6 issues), July (5 issues), August (6 issues), September (6 issues), October (5 issues), November (7 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1987 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests for reprints and permission should be addressed to Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 255-6286 or in New Jersey call (800) 322-6286.
Subscription rates: $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1566, Neptune, NJ 07754-1566.

INSIDE LINES

Better late than never. Fifteen months after IBM first announced it, Enhanced Connectivity Facility began shipping last week. The software, which provides a "uniform structure" for IBM Personal Computers to access data, applications and peripherals on IBM 370 hosts, is part of IBM's Systems Application Architecture.

Such a bargain. The first IBM 3090 Model 120E shipped last week, bound for the University of Illinois at Chicago. Introduced in May as a tuned-down, sub-$1-million entry point for the 3090 mainframe family, the Model 120E was scheduled for October delivery.

The greening of Emerald Bay. Migent, the firm that hired enough Ashton-Tate employees to prompt a lawsuit, has its data base engine — dubbed Emerald Bay — in beta test. The product, which employs an SQL-compatible engine with an Ashton-Tate Dbase-compatible module, may be released by year's end, one beta-tester said. The product is, however, a tad late. It was originally promised by the end of this past March.

Dbase Jr.? Sources report that Ashton-Tate may be close to acquiring Frontrunner, a RAM-resident mini Dbase, from Apex Software. If acquired, the package will be bundled with Dbase IV and will serve as a utility for users who may not want to fire up the complete package, which is expected to be a very large program.

Chipping in. AST Research will announce Oct. 19 in New York its Premium/386 micro using the 20-MHz 80386 version, according to a company official. The 386 will feature IBM Extended EGA graphics, an undetermined hard-disk capacity of anywhere from 30M to 70M bytes and a 5¼-in. floppy disk drive as standard, with a 3½-in. microfloppy available upon request. A 386 accelerator board for Premium/286 micros and other IBM AT compatibles is expected as well this fall.

By the way. . . Maybe Cray didn't throw the baby out with the bathwater when key designer Steve S. Chen left the company in hopes of continuing his work on a new supercomputer elsewhere. Last week, the company revealed that a second development team has been working quietly since earlier this year in parallel to Chen's team and will continue that work on the computer informally known as the MP.

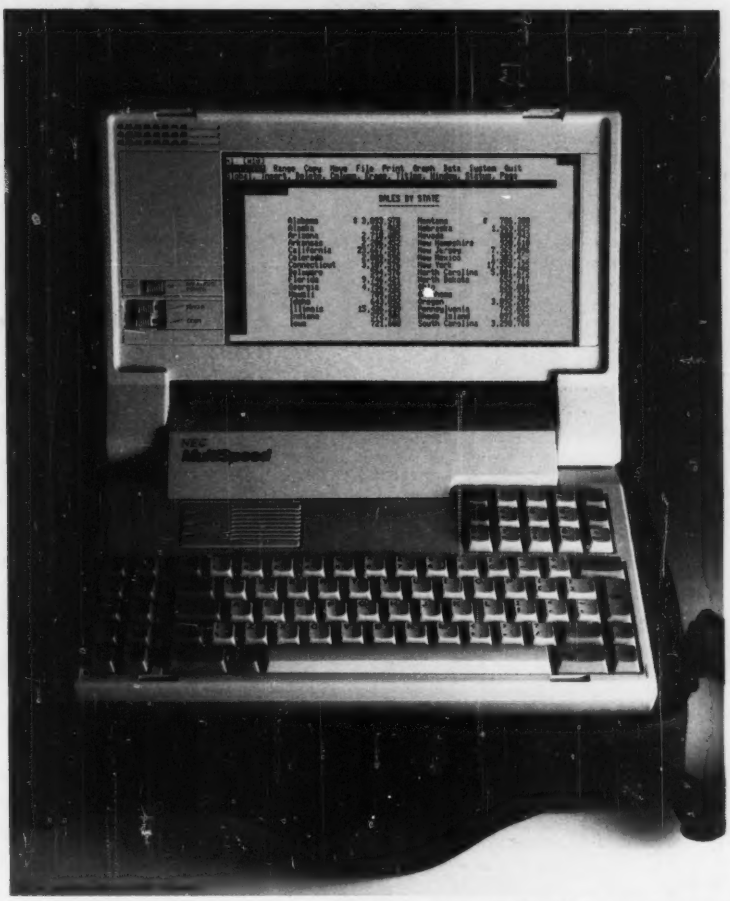
The third party. A second independent servicer of Hewlett-Packard minicomputers has filed suit against HP, claiming unfair trade practices against the third-party maintenance market. Cleveland-based Hypoint Technology followed the lead of a suit filed last year by a firm with the ironic name of Datagate. Hypoint's case centers on the HP service policy change of Aug. 1 that eliminated four-hour response time for HP service customers contracted for time and materials rather than full HP service. Attorney Ronald Katz, who also represents Datagate, says the policy was changed to drive third-party competitors out of business.

Megaflop. Midland Bank PLC has discontinued plans with Hogan Systems to develop a "megabank" integrated software system. Hogan said the cancellation will have no negative effect on this year's financial results. The company is predicting a loss of between $2.5 million and $3 million for the current quarter (see story page 95).

Not bleedin' likely, mate. Harris last week denied published reports that it had agreed to be acquired this summer by English telecommunications giant Plessey Co. but that the deal had stalled because of U.S. Department of Defense concerns. "We are not in, and have not been in, negotiations of this nature with anyone," Harris CEO John Hartley said in a prepared statement. We "believe that the interest of shareholders, customers and employees can best be served by Harris remaining independent."

DASD over Dewar's. Electronic products surpassed Scotch whiskey for the first time as Scotland's leading export commodity in 1986, according to the Scottish Development Agency.

Our new screen eliminates shady characters.



Take the Multi and run.
MultiSpeed™ EL

Now the world's fastest portable computer makes every character bolder and brighter.

That's because the new MultiSpeed EL has a backlit screen. Which means you can easily read it anywhere you choose to use it. On the plane. In the car. Even in the dark.

This is the portable that combines a clock speed of 9.54 or 4.77 MHz with the NEC 16-bit V-30 processor and 640K RAM. So it's not only quick, but powerful enough to do most anything a desktop can do.

Standard Features			
Clock Speed	9.54/4.77 MHz	*Screen type*	Backlit LCD
Memory	640K bytes	*Keyboard*	Full Size
Bit-in Software	5 programs	*Numeric Keypad*	Separate
Disk Drives	Dual 720K (3.5")	*Weight*	11.5 lbs.

What's more, it's PC compatible. And even does windows.

You'll find the new MultiSpeed EL at ComputerLand, Connecting Point, Eczel, MicroAge and Sears Business Systems Centers. For product literature or the location of your nearest dealer call 1-800-447-4700.

If you already own a Multi and would like to upgrade your screen, or need technical information, call NEC Home Electronics (USA) Inc. at 1-800-NEC-SOFT.

You'll find your job a lot easier when you work with brighter characters.

C&C Computers and Communications

NEC®

AFTER A THOROUGH EXAMINATION, JEWISH HOSPITAL CHOSE MSA.

Some of the finest physicians in the Midwest practice at Jewish Hospital in St. Louis. It's an excellent hospital with an excellent reputation. But it *is* a business, and recently, due to a desire for better information access and control, Jewish Hospital found a need to convert from a shared computer system to a private one.

So after very careful consideration, Jewish Hospital converted to Financial, Human Resource and Materials Management software systems from Management Science America, Inc.

"Initially, we looked at 15 software companies," said John McGuire, executive vice president of the hospital. "In making our evaluation, we considered solicitations and talked with the users of various systems. We then considered five finalists who gave presentations. Then we narrowed our choice down to two, and ultimately went with MSA."

Why MSA over all the other software companies?

"User satisfaction with their products," was one of the reasons McGuire cited. "Also, MSA's customer service reputation was very good. We feel we made the right choice by going with MSA."

Now that MSA and Jewish Hospital are working together, the hospital is integrating its operational and financial information. According to McGuire, "MSA is helping us take better care of the business side of our hospital...and that lets us take better care of our patients."

If you would like to know more about what we're doing for Jewish Hospital, or what we can do for your business, contact Robert Carpenter in Atlanta at (404) 239-2000.

MSA The Software Company

©1987 Management Science America, Inc.